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Do Leaders Affect Ethical Conduct?

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Abstract: We study whether leaders influence the unethical conduct of followers. To avoid selection issues present in natural environments, we use a laboratory experiment in which we form groups and assign leadership roles at random. We study an environment in which groups compete, with dishonest behavior enhancing group earnings to the detriment of social welfare. We vary, by treatment, two instruments through which leaders can influence follower conduct—prominent statements to the group and the allocation of monetary incentives. In general, the presence of active group leaders gives rise to significantly more dishonest behavior. Moreover, appointing leaders who are likely to have acted dishonestly in a preliminary stage of the experiment yields groups with significantly more unethical conduct. The analysis of leaders' strategies reveals that leaders' statements have a stronger effect on follower behavior than the ability to distribute financial rewards, and that leaders' propensity to act dishonestly correlates with their use of statements or incentives as a means for encouraging dishonest follower conduct.

Keywords: leadership, ethics, dishonesty, experiment

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1. Introduction

Responses to unethical conduct in organizational, political or social settings often turn attention to the role of leaders in facilitating or encouraging such behavior. For example, accounts of corporate fraud often emphasize the influence of CEOs and other senior executives. Analysis of the well-known case of WorldCom's dramatic collapse in 2002 often focuses on the role played by its founder, chairman and CEO, Bernard Ebbers. Indeed, the Special Investigative Committee examining WorldCom's collapse on behalf of the SEC prominently noted that Ebbers "was the source of the culture, as well as much of the pressure, that gave birth to this fraud" (Beresford, et al., 2003, p. 1).

However, despite the widespread belief that leaders play a critical role in producing unethical conduct in groups or firms that they lead, there is little direct evidence of such a relationship. This is not surprising, since important challenges make it hard to cleanly identify the influence of leaders in fomenting unethical conduct. For starters, unethical conduct in the field, by its nature, is often hidden from view. We typically fail to observe a large proportion of unethical conduct, either by leaders or by those who follow them, which makes the study of this relationship difficult. Moreover, even if there is a relationship between the actions of leaders and the unethical conduct of followers, causality is often impossible to establish due to non-random selection of leaders in the field: when a corrupt firm has an unethical CEO, is the leader the source of the culture, or is it the culture that led to the appointment of an unethical leader?

Recognizing these identification problems, in this paper we employ a novel approach to study the relationship between leadership and unethical conduct. In particular, we conduct a laboratory experiment, which allows us to exploit the high degree of control afforded by the laboratory environment to avoid many of the problems present in more natural settings. In our experiment, we study the impact of leadership by exogenously varying who becomes a leader and which abilities the leader has to influence the behavior of members of each laboratory firm. We therefore compare firms with "leaders," endowed with some of the influence channels typical of organizational leaders, such as the ability to make public statements and control over financial incentives, with "control" firms that hold everything constant except for the presence of such channels.

Our results show that leaders who are, themselves, more dishonest in a first stage of the experiment yield groups that act more dishonestly. Thus, we provide clean

evidence of the causal effect of unethical leaders on the unethical conduct of followers. In particular, the ability of leaders to communicate to followers appears to be responsible for the largest increase in cheating—firms in environments with leaders who can make statements tend to increase dishonest behavior significantly more over time than firms where leaders have no such ability.

Our study represents a novel contribution to the literature on leadership and the ethical conduct of groups. The argument that leaders shape the ethical conduct of followers is often supported in the existing literature by evidence that is not entirely compelling, due to the identification problems outlined above. For example, some of the strongest evidence in support of such a relationship comes from studies that use survey-based instruments to measure followers' perceptions of the degree to which a leader possesses "ethical" characteristics (e.g., the "Ethical Leadership" scale developed by Brown, et al., 2005), and then correlate this measure with other subjective measures of whether individuals within an organization act ethically (Mayer, et al., 2012). While such studies often find positive correlations between perceptions of leaders' honesty and perceptions of ethical conduct in a firm, the results must be interpreted cautiously due to many possible interpretations, including the possibility of correlated bias across such subjective measures.

Given the hidden nature of unethical conduct, other studies attempt to identify a relationship with leadership by using objective measures of observable behaviors that are potentially correlated with unethical follower conduct, such as employee exit or excess costs (Detert, et al., 2007; Burks & Krupka, 2012).[1] A recent paper by Beekman, et al. (2013) similarly uses a proxy for corrupt leader behavior—the misplacement of community resources under the leader's control—and shows that this leads to lower cooperation among community members, though not necessarily to more unethical conduct. As with the studies discussed above, these results are more suggestive of a relationship, since they ultimately only observe behavior that is imperfectly correlated with unethical conduct.[2]

We follow other research that relies on laboratory experiments to identify causal

[1] Pierce and Snyder (2008) similarly use observable measures of employee behavior to identify whether firms' ethical cultures influence the behavior of workers changing jobs.

[2] Other studies, not directly related to ethical conduct, show a relationship between leaders' behaviors and the prevalence of cooperative behavior within a group (Kosfeld and Rustagi, 2012; Jack and Recalde, 2013).

effects of leadership on follower behavior.[3] For instance, Potters, et al. (2007) experimentally investigate leading-by-example in a public good environment and find that contributions increase when a leader has private information about the returns to contributing. Also in a public good game, Hamman, et al., (2011) show that delegating contribution decisions to a pro-social leader allows groups to obtain full efficiency. Brandts and Cooper (2007) and Brandts, et al. (forthcoming) study the effect of leaders on effort provision in weak-link coordination games, finding that leaders can increase minimum effort by means of communication, and that this may be a more effective strategy for inducing behavioral change than financial incentives.

Our work also contributes to the growing experimental literature on the determinants of dishonest and unethical conduct (Gneezy, 2005; Mazar, et al., 2008; Gino, et al., 2009; Fischbacher and Föllmi-Heusi, 2013; Gibson, et al., 2013; Conrads et al., 2013, 2014). In line with these studies, we address the concern that unethical conduct is hard to observe through the use of a behavioral task in which subjects have the opportunity to act unethically—i.e., to tell a lie for profit in a manner that will never be detected—but where our ability to create numerous identical replications of the same situation makes inference regarding the presence of unethical conduct possible. Specifically, we ask subjects to privately roll a die, but give them the opportunity to misreport the actual outcome, with no possibility that lies will be discovered (cf. Fischbacher and Föllmi-Heusi, 2013). Reporting a higher number earns more money for a subject and for others in the subject's firm, but it also imposes an inefficient negative externality on everyone else in an experimental session—mimicking the property that widespread unethical conduct can be harmful to an industry.

Thus, our experimental environment incorporates key features of real-world situations involving a tension between acting ethically or unethically. Misrepresenting the die roll in our experiment, while personally beneficial and benefitting others in one's firm, is wrong according to most normative moral principles (e.g., Kant, 1785; Mill, 1863). Moreover, unethical conduct, at the individual level, is entirely hidden from view, meaning there is zero probability of sanctioning or detection of individual unethical

[3] There are rare cases in which random variation exists in the field. These studies provide valuable insights into the influence and importance of leaders, e.g., leaders' gender and public good provision (Chattopadhyay and Duflo, 2004); national leaders and economic growth (Jones and Olken, 2005); CEOs and firm performance (Malmendier and Tate, 2009).

conduct. Hence, "good" behavior is likely the result of ethical considerations, rather than fear of detection or punishment (Nagin, et al., 2002). However, the fact that we can observe the aggregate results of many such individual decisions in our laboratory setting allows us to make statistical inference about the presence of unethical conduct, and how this varies with features of the environment.

The main part of our experiment consists of two stages. The first of these is intended to obtain baseline measures of individuals' tendency to act unethically, while the second constitutes the interaction between leaders and workers. More precisely, in the first stage, participants perform the die-roll task once individually, with the possibility to benefit personally from misreporting, which also harms all others in a subjects' experimental session. Thus, we obtain a (noisy) measure of each individual's tendency to misreport, which we show correlates with other individual characteristics.

In the second stage, which is our primary focus, participants are randomly matched into four-person firms, and one person within each firm is randomly selected to be the leader, while the remaining three subjects are workers. In this stage, each firm's payoff depends on the firm's average reported performance, relative to the average reported performance of other firms. Subjects repeat the die-roll task 10 times in fixed groups. Experimental conditions vary whether leaders can make statements to workers, allocate financial rewards to them, or do both. In a control condition, with inactive leaders, they have no power at all and instead simply observe outcomes. We observe how reported performance varies over time depending on the experimental treatment, on specific strategies employed by the leaders, and on leader's characteristics.

The key variation that we introduce in the second stage of the experimental environment concerns the tools available to leaders to influence workers' reported die-roll outcome. The first influence channel with which we provide leaders is the ability to make public statements to the workers in their firm. Organizational leadership is often associated with someone who, from a position of prominence, can articulate a broad direction for the firm and motivate employees in pursuit of that end (Kotter, 1990). In his seminal book on corporate executives, Barnard (1938) notes that one of their fundamental functions "is to formulate and define the purposes, objectives, ends, of the organization" (p. 231). Modern studies of and training in corporate leadership similarly note the importance of a leader's ability to motivate and convince followers to pursue a

particular direction, often through prominent and visible speeches (Antonakis, et al., 2012). As noted by Lazear (2012), leaders "choose the right direction for an organization. Leaders communicate to their subordinates and motivate them to take productive actions" (p. 92). We implement a simple form of this leadership function in our experiment, by providing leaders with a platform to send messages to workers in their firm between periods of the task.

Second, corporate leaders often possess discretion over financial incentives. A central theme in organizational economics is the use of monetary incentives as a means for motivating employees to act in a manner desired by their employers or supervisors. Such incentives take many forms, from fixed wages, to precisely defined explicit performance contracts, to subjectively determined performance bonuses at the discretion of supervisors (Baker, et al., 1994; Prendergast, 1999). In principle, a leader could use any form of variable pay to incentivize ethical or unethical behavior. In our experiment, we provide leaders with the ability to distribute part of employees' compensation in the form of a discretionary bonus.

Note that these two instruments available to leaders in our experiment correspond to important influence channels ascribed to leaders in the leadership literature. For example, central to the study of leadership in the organizational literature is a distinction between "transactional" and "transformational" leaders (Burns, 1978), with the former inducing change among followers through sanctions and rewards and the latter doing so through persuasion and by influencing follower preferences (Bass, 1990). Thus, our design can be viewed as a simple way of providing leaders with simple versions of these two potential influence channels.[4]

We classify leaders as likely honest or dishonest, based on their reported performance in the first stage of the experiment. We find that dishonest leaders are more likely to encourage dishonesty, particularly through their use of statements. Moreover, through the analysis of leaders' rewarding and communication strategies, we find that leaders have the ability to influence followers both through the statements that

[4] Of course, leaders also do many other things than what we allow them to do in our experiment. For example, they often set examples for followers through their actions (Hermalin, 1998; Levati, et al., 2007) and select or exclude organizational members (Güth, et al., 2007). For simplicity and control, we chose to focus on two specific leadership functions in the current experiment. The omission of other channels of leader influence likely underestimates the degree to which leaders influence followers in more natural settings. Our experimental design can be naturally extended to include other such possible channels.

they make and through the use of bonuses. Statements from leaders requesting honest reporting are effective in yielding firms that (statistically) report more honestly. However, leaders' statements tend, over time, toward requests for greater dishonesty, thus producing a strong tendency toward misreporting in conditions in which leaders have the ability to communicate with workers.

Our results have potentially important policy implications for the design of organizations and the definition of leaders' responsibilities. Most importantly, we document a causal relationship between unethical leaders and the unethical behavior of those they lead—unethical leaders tend to produce more unethical conduct. Moreover, we show that leaders' statements to those they lead are a central channel through which such influence occurs and that such influence can be stronger than that of financial rewards. We also show a direct link between leaders' ethical conduct, their choice of leadership strategies and group members' honesty. Such leadership effects underscore the importance of establishing institutional checks on leaders' ethical behavior, since leaders can spread unethical behavior within an organization at very little cost, if they wish. On the other hand, our study also indicates that the selection of ethical leaders and their use of strategies, including public statements, that encourage ethical conduct may have strongly positive effects on followers' ethical behavior.

The rest of the paper is structured as follows. In section 2, we describe the experimental design. In section 3, we present our results. Section 4 concludes.

2. Experimental design

Each experimental session consists of 20 participants interacting through computers. The experiment comprises three stages, with the first two stages constituting the main part (see Figure A.1 in the Appendix for an overview of the experiment). In the first stage, subjects engage in an individual reporting task, in which they can act unethically by inflating their performance and thereby obtain higher individual earnings at the expense of social welfare. The second stage modifies the task into one in which subjects repeatedly compete in "firms," with varying degrees and forms of leadership, for 10 periods. Our primary focus is on how leadership influences misreporting in the second stage. In the third stage, we elicit measures of perceived social norms of conduct, using a procedure developed by Krupka and Weber (2013), and also several individual-level characteristics through a questionnaire. Subjects

receive the instructions for each stage separately at the beginning of the stage, but are informed about the overall structure of the experiment from the outset.

2.1 First stage

In the first stage, all 20 participants, $i \in \{1, \ldots, 20\}$, compete for a prize of varying size, V. We introduce the possibility of cheating in the competition—which is undetectable and profitable for an individual, but socially inefficient—as a way of studying unethical behavior.

At the beginning of the stage, each subject privately rolls a fair six-sided die, the outcome of which, p_i, can be thought of as a subject's actual realized type or performance in that period. Thus, actual "performance" is uniformly distributed over the outcomes, $p_i \in \{1, 2, \ldots, 6\}$. Subjects are instructed that it is this value, p_i, which they are supposed to report as their performance in the period for the purposes of the competition. However, since only a subject observes his or her own die roll, the performance reported by any subject, $\tilde{p}_i$, can be any integer from 1 to 6 that the subject chooses to report. Each subject receives a share of the prize, s_i, which increases in that subject's own reported performance, $\tilde{p}_i$, relative to the performance reported by other subjects, $\tilde{p}_{-i}$. Below, we provide the precise formula for determining s_i.

The size of the total prize available is a function of the average performance reported by all subjects. Specifically, the total prize obtains its maximum possible value as long as the average of all the $\tilde{p}_i$ is equal to or below the expected mean of 20 fair die rolls, or 3.5. However, if the mean reported performance exceeds 3.5 then the size of the prize decreases linearly with the average reported performance. Thus, misreporting negatively impacts the size of the prize, and the prize is lowest when all subjects report the maximum possible performance of 6. Our design, therefore, captures the property that widespread unethical conduct can harm a society or industry. Hence, misreporting in our experiment is "wrong" both because it involves telling a lie (i.e., violating deontological ethical principles) and because it harms social welfare (violating consequentialist moral principles, such as utilitarianism).

More precisely, a subject's profit, π_i, is the subject's share of the prize, determined by the ratio of own performance to total performance, multiplied by the total size of the available prize:

$$\pi_i = s_i(\tilde{p}_i, \tilde{p}_{-i})\, V(\tilde{p}_i, \tilde{p}_{-i}) = \frac{\tilde{p}_i}{\tilde{p}_i + \sum_{j=1, i\neq j}^{20} \tilde{p}_j}\, V(\tilde{p}_i, \tilde{p}_{-i})$$

$$\text{with } V(\tilde{p}_i, \tilde{p}_{-i}) = \begin{cases} a & if\ \frac{\sum_{i=1}^{20} \tilde{p}_i}{20} \leq \mu \\ a - b\left(\frac{\tilde{p}_i + \sum_{j=1, i\neq j}^{20} \tilde{p}_j}{20} - \mu\right) & if\ \frac{\sum_{i=1}^{20} \tilde{p}_i}{20} > \mu \end{cases},$$

where $\mu = 3.5$, $a = 1250$ and $b = 300$. Subjects' payoffs are measured in Experimental Currency Units (ECUs), which are converted into money at the end of the experiment.

The parameters are chosen such that, under the assumption of self-interest and no psychological cost to lying, the unique Nash equilibrium is for all players to report the highest possible outcome of the die roll, $\tilde{p}_i = 6$ (see Appendix C). This yields a total prize of $V = 500$, which is considerably lower than the maximal possible total prize of $V = 1250$.

After rolling the die privately, each subject enters his or her reported performance on the computer. While we cannot detect lying at the individual level, the aggregate distribution of reported performance values allows us to detect, statistically, the degree of misreporting (cf. Houser, et al., 2012; Fischbacher and Föllmi-Heusi, 2013; Gino, et al., 2013). The task is performed only once in Stage 1 and afterwards all subjects are informed about the average reported performance across all subjects, the total size of the prize, and their own payoff for Stage 1.

2.2 Second stage

In the second stage we use the same task, but this time in the context of competing "firms," where inflation of performance by a worker benefits the worker's firm, but imposes a negative externality on all other firms.

In Stage 2, the 20 subjects in a session are randomly matched into five four-person firms—consisting each of three workers and one leader (referred to as the "supervisor"). Workers individually and privately each roll a die and report performance, as in Stage 1. The function of the leaders varies by condition.

Similarly to Stage 1, firms compete for shares of the prize, V. Each firm, $f \in \{1, 2, \ldots, 5\}$, obtains a share, s_f, based on the average reported performance by the three workers in that firm, $\tilde{p}_f = \left(\sum_{i=1}^{3} \tilde{p}_{i,f}\right)/3$, relative to the average reported performance in other firms. As in Stage 1, V is highest when the average of all firms' reported performance levels is no greater than 3.5, but decreases for higher average reported performance across the industry. The profit obtained by each firm is then:

$$\pi_f = s_f(\tilde{p}_f, \tilde{p}_{-f})\, V(\tilde{p}_f, \tilde{p}_{-f}) = \frac{\tilde{p}_f}{\sum_{f=1}^{5} \tilde{p}_f}\, V(\tilde{p}_f, \tilde{p}_{-f})$$

$$\text{with } V(\tilde{p}_f, \tilde{p}_{-f}) = \begin{cases} a & if\ \frac{\sum_{f=1}^{5} \tilde{p}_f}{5} \leq \mu \\ a - b\left(\frac{\sum_{f=1}^{5} \tilde{p}_f}{5} - \mu\right) & if\ \frac{\sum_{f=1}^{5} \tilde{p}_f}{5} > \mu \end{cases},$$

where $\mu = 3.5$, $a = 1250$, and $b = 300$.

Each subject in firm f receives an individual share $x_{i,f}$ of the firm's profit π_f. The leader always receives a share of one-fourth of the total firm profit, $x_{L,f} = 0.25$. The shares received by workers can vary across experimental conditions. In some of our conditions, each of the four firm members receives an equal share of the firm's profits, e.g., $x_{i,f} = 0.25$ with $i \in \{L, 1, 2, 3\}$. If this is the case, each individual worker benefits from reporting the highest possible performance level, or 6, regardless of what other subjects report (see Appendix C). In other experimental conditions, described below, the firm supervisor can determine the share of the firm's profits received by each worker. In these cases, the supervisor's reward strategy can either strengthen or weaken the incentives to report performance of 6.

Roles of workers and supervisors are allocated randomly within each firm, and remain fixed during all 10 periods of Stage 2. After each period, all subjects are informed about their own profit, their firm's profit, the average reported performance level of each of the five firms, the overall average reported performance level, and the individual reported performance levels and profits of all members of their own firm.

2.3 Leader conditions

We study four treatment conditions, in a 2 x 2 design (see Table 1), which vary the instruments available to the leader in the second stage of the experiment. In particular, we vary the ability of leaders to determine incentives, through performance bonuses, or to articulate a direction for the firm, through prominent statements to workers.

Table 1: Overview of treatment conditions

Treatment	**No incentive power**	**Incentive power**
No public statements	Inactive Leader	Leader Incentives Only
Public statements	Leader Statements Only	Leader

Note: For each condition, we conducted four sessions with 20 subjects each.

Public statements vs. No public statements. In the two conditions with public statements, leaders send a message to the three workers in their firm at the beginning of each period, before workers roll their dice and report their performance level. Specifically, leaders have 90 seconds at the beginning of the period to send a written message to workers in their firms using the computer interface.[5] Leaders send statements to their workers, but workers cannot reply to the leader or send messages to one another. Conversely, in the two conditions without public statements, leaders cannot send messages to workers.

Incentive power vs. No incentive power. In the two conditions in which leaders have no incentive power, all four subjects in each firm receive the same share, 25 percent, of the group profit as payoff in a period. Thus, worker payoffs are independent of any actions of the leader. In the conditions with leader incentive power, leaders have the ability to distribute financial rewards among the workers. Leaders observe the reported performance level of each of the three workers in the firm, and the resulting firm profit, and must then decide how to allocate 45% of the group profit among the three workers.[6] The leader has to allocate the entire 45% among the three workers and cannot keep any part of it or hold money back. More precisely, of the profits received by the firm in a period, π_f, the leader receives a fixed share of one-fourth, $x_{L,f} = 0.25$. The three workers each receive a guaranteed portion of the profits, 10 percent, plus a share of the remaining 45 percent of the firm profits allocated to that worker by the leader. That is, a worker's share of the firm's payoff is, $x_{i,f} = 0.10 + y_{i,f}$, where $y_{i,f} \in [0, 0.45]$ is the share of the discretionary bonus allocated to that worker by the leader and $\sum_{i=1}^{3} y_{i,f} = 0.45$. At the end of the period, workers are informed about the

[5] Subjects are asked not to use offensive language, not to identify themselves, nor to try to identify others.

[6] We choose this type of incentive for a few reasons. First, such subjective allocation of rewards is commonplace in many firms, e.g., in the form of discretionary monetary bonuses or fixed pay increases in contexts ranging from financial firms to academic departments or in the allocation of non-financial rewards such as desirable office space or professional perks. Second, since we are interested in unethical conduct, which is often unobservable and unenforceable in pay contracts, a discretionary bonus seems appropriate. Third, we wanted to provide leaders with considerable flexibility in their ability to allocate rewards; this is limited if we provide them with one specific kind of incentive contract (e.g., a piece-rate or target-based scheme) and complicates the experiment if we introduce too many such schemes. Note also that, in combination with the ability to make statements to employees, our firm leaders are, in principle, able to specify a large variety of *ex ante* performance contracts.

reported performance, allocated rewards, and total earnings of all workers in their firm.[7] Thereby, they can infer which kind of reported performance the leader rewards.

The *Leader* condition in our experiment provides leaders with both channels through which they can influence the conduct of firm workers, i.e. the leader can send statements before every period and allocate rewards at the end of each period. The *Inactive Leader* condition serves as a suitable control—there is still a person in the role of "supervisor" and this person receives a 25-percent share of the firm's profits. But, this person cannot do any of the things that leaders do. A comparison between the Inactive Leader and Leader conditions allows us to understand the causal effect of having someone with these leadership instruments on the ethical conduct of followers.

The two other conditions, *Leader Statements Only* and *Leader Incentives Only*, vary only in the presence or absence of these two instruments available to the leader. By eliminating one instrument and keeping the other, we provide evidence on the relative importance of these distinct potential influence channels.

Moreover, within each condition with an active leader (i.e., excluding the Inactive Leader condition), we can test how different characteristics of and strategies employed by leaders affect the degree of misreporting in their firms. This also allows us to test our central motivating question—whether unethical leaders (identified statistically by their behavior in Stage 1) yield more unethical conduct on the part of workers.

2.4 Third stage

Following Stage 2, we elicit subjects' perceptions of social norms regarding the appropriateness of inflating performance in the first and second stages of the experiment. We follow the method introduced by Krupka and Weber (2013), in which subjects are provided with a description of a possibly unethical act, and then rate the "social appropriateness" of this behavior, with an incentive to match the ratings provided by others.[8] We use these elicited social norms to explore whether leaders affect the social norms held by individuals in the firms that they lead.

[7] The information available to all subjects is constant across experimental conditions (see section 2.2).
[8] For instance, we ask subjects to rate how socially appropriate it is for a subject who rolled a 1 in the first stage of the experiment to report a higher number. We incentivize their answer by giving them an extra £ 0.5, if their answer matches the answer of a randomly chosen other subject in their session.

Finally, we collect several psychological measures of personality traits (Protected Values toward acting dishonestly, following Gibson, et al. (2013); Big Five 15-item version; Machiavellianism MACH IV) as well as socio-demographic measures.[9]

2.5 Procedural details

In total 320 subjects participated in the experiment—80 subjects (20 firms) in each condition. Of the total participants, 41% were students of economics, finance, or management and 56% were male (see Table B.1 in the Appendix for summary statistics). The experiment was computerized using the software z-tree (Fischbacher, 2007) and subjects were recruited using ORSEE (Greiner, 2004). All sessions were conducted in January and February 2013 at the Birmingham Experimental Economics Laboratory of the University of Birmingham. Experimental Currency Units (ECUs) were converted into GBP at the rate of 40 ECUs = 1 GBP. Each session lasted approximately two hours, and subjects earned, on average, £ 19.94 including a show-up fee of £ 2.50.

3. Results

In presenting our results, we first discuss subjects' behavior in Stage 1, to get a sense of the prevalence of dishonesty in the population (cf. Fischbacher and Föllmi-Heusi, 2013). Then, we turn to our main research question—i.e., whether leader characteristics influence workers' performance reports in Stage 2. Afterward, we analyze through which channels leaders affect firm behavior.

3.1 Individual behavior in Stage 1

Table 2 shows the average reported performance in Stage 1, by condition. Recall, that Stage 1 is identical across all conditions; instructions for Stage 2 are only distributed after Stage 1. In all conditions, we find evidence of misreporting. Overall, the mean reported score is approximately 4.5, which is higher than the empirically expected mean score, of 3.5.[10] Note, however, that these scores are still well below the individual payoff-maximizing report of 6. As expected, individual behavior in the first stage does

[9] Appendix D provides the complete instructions used in the experiment.

[10] Recoding the observed die-roll outcomes of the "externality treatment" in Fischbacher and Föllmi-Heusi (2013) to correspond to our design yields a mean score of 4.18, which is marginally significantly lower than our observed mean outcome (t-test p=0.10).

not differ significantly between the four conditions (two-sided Kruskal-Wallis test p=0.85).[11]

Table 2: Average reported performance in Stage 1

Inactive Leader	Leader	Leader Incentives Only	Leader Statements Only	Total
4.48	4.49	4.59	4.44	4.50
N=80	N=80	N=80	N=80	N=320

The distribution of reported performance levels is also highly right-skewed: 26.25% of observations are 3 or lower, while 73.75% are 4 and above. The median is 5 and the mode of the distribution is at 6. Figure A.2 in the Appendix shows the distributions of reported performance by condition and Table B.2 in the Appendix shows that, in every condition, the frequency of scores of 1 (6) is significantly lower (higher) than the expected frequency of 1/6.

Finally, we consider whether individual characteristics, measured at the end of the experiment, predict Stage 1 responses. Regression analysis shows that reported performance in the first stage is significantly higher if the subject is male, younger, an economics student, or scores higher on the Big Five conscientiousness dimension (Table B.3 in the Appendix).[12]

3.2 Do unethical leaders produce unethical groups?

We next consider behavior in Stage 2, when subjects performed the task collectively in firms, sometimes with active leaders. To analyze whether unethical leaders influence the degree of misreporting among their workers, we first need to construct a measure of a leader's propensity to act honestly. Specifically, we use a

[11] Pair-wise Mann-Whitney tests reveal no significant differences between any two conditions: Inactive Leader vs. Leader Statements Only (p=0.64), Inactive Leader vs. Leader Incentives Only (p=0.59), Inactive Leader vs. Leader (p=0.97), Leader Statements Only vs. Leader Incentives Only (p=0.34), Leader Statements Only vs. Leader (p=0.75), and Leader Incentives Only vs. Leader (p=0.66). Moreover, the mean reported performance of subjects subsequently assigned to be leaders (4.43) does not differ significantly from the mean reported performance by those who became workers (4.52; two-sided Mann-Whitney test p=0.44).

[12] Conscientiousness is defined as a tendency to show self-discipline and act dutifully. It is related to the way in which people control, regulate, and direct their impulses. High scores on conscientiousness indicate a preference for planned rather than spontaneous behavior (Costa and McCrae, 1992).

binary variable, *dishonest leader*, which indicates whether a leader's reported Stage 1 performance equals 6. Since the frequency of scores of 6 in Stage 1, equal to 37.53%, is significantly higher than the expected frequency of 1/6 (see Figure A.2 in the Appendix), we expect this variable to be correlated with misreporting. Note that this proportion is more than twice as high as the expected frequency. Hence, conditional on observing a reported performance of 6, it is more likely that an individual in our experiment misreported than otherwise.[13]

Figure 1: Leaders' honesty and average reported group performance over time

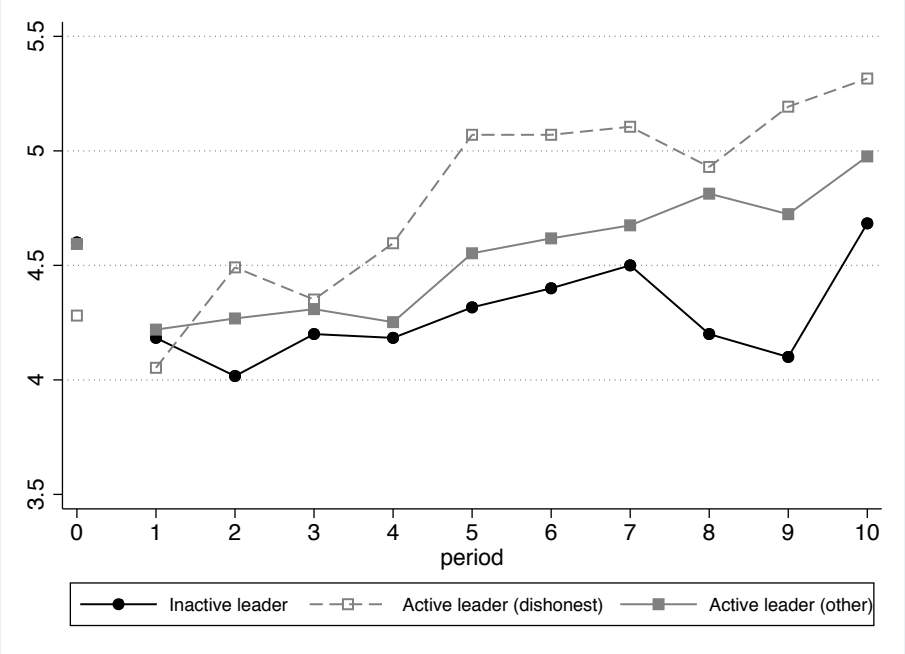


Figure 1 shows average reported group performance over time in the Inactive Leader condition and in all conditions with active leaders. We divide the observations from the active leader conditions, depending on whether the leader is classified as dishonest or not. The graph also includes, as "Period 0," the average Stage 1

[13] Of course, this is a noisy measure of dishonesty—it misclassifies some honest leaders who actually obtained scores of 6 in Stage 1 and misses some dishonest leaders who may have lied but only reported a score of 5 (see Fischbacher and Föllmi-Heusi, 2013). Our goal is to use a measure that captures a tendency toward high scores, which likely captures a greater proportion of those who misreport. The results are qualitatively the same if we define the indicator variable as those leaders who reported performance of 5 or 6 in Stage 1 or who reported a Stage 1 performance higher than the average performance reported in their session.

performance of leaders and workers in the respective conditions; consistent with our earlier analysis, these means are statistically indistinguishable.

In the Inactive Leader condition, average reported performance is fairly stable over time, with only a slight upward trend, and the average reported performance is generally similar to that from Stage 1. Thus, while there is some evidence of misreporting in the absence of active leaders, its incidence does not change much over time—with the exception, perhaps, of the last period—and remains relatively modest in magnitude.

In contrast, reported performance is higher and increases more strongly over time in conditions with an active leader. This upward trend in reported performance is stronger for groups with leaders classified as dishonest.[14] Considering average reported performance across all periods, we observe a significant difference between groups led by active leaders classified as dishonest and those led by other active leaders (4.82 vs. 4.54, two-sided Mann Whitney test, $p<0.001$).[15]

We test the relationship between leaders' honesty and followers' behavior in Table 3. We regress, using a tobit specification with subject random effects,[16] the reported performance of workers in Stage 2 on variables related to the leadership condition, on a time trend, and on workers' initial propensity to act honestly. We also control for the overall level of cheating within the worker's firm—measured by the worker's firm's share of the prize in the previous period (s_f)—and within the session—measured by the size of the prize in the previous period (V) relative to the maximum possible size of the prize (1250). Results of Model 1 indicate that dishonest leaders and active leaders generate more unethical conduct. Moreover, workers who report higher performance in Stage 1 also tend to do so in the second stage. The time trend in Figure 1 is also confirmed by Model 1, as dishonesty significantly increases over time. The

[14] These trends in reported performance generally correspond to an opposite pattern in payoffs (see Figure A.3 in the Appendix). Average payoffs decrease only slightly over time with inactive leaders, and more strongly with active leaders. However, groups with dishonest active leaders receive slightly higher average profits than those with honest leaders.

[15] As a placebo test, we would not expect dishonest leaders to affect reported performance in the Inactive Leader condition. Indeed, average reported performance does not differ significantly between workers who are led by dishonest leaders and those who are not (4.25 vs. 4.29, two-sided Mann Whitney test: $p=0.76$).

[16] Throughout the paper, we use censored regression models when we analyze reported performance, since this variable is censored from below at 1 and from above at 6. The results do not change, qualitatively, if we use linear regression models or ordered probit models.

additional controls show that having received a higher share of the prize in the previous period is associated with higher reported performance and that lower overall levels of cheating in a session are correlated with lower reported performance.

Table 3: Leaders' honesty and reported performance

Dependent variable	**Stage 2 performance**		
	(1)	**(2)**	**(3)**
Dishonest leader (Leader's stage 1 perf = 6)	0.681***	-0.264	-1.066
	(0.237)	(0.521)	(0.760)
Active leader	0.503**	0.240	-0.355
	(0.248)	(0.278)	(0.405)
Dishonest leader * Active leader		1.188**	1.537*
		(0.587)	(0.855)
Period	0.138***	0.138***	0.043
	(0.022)	(0.022)	(0.042)
Dishonest leader * Period			0.134
			(0.093)
Active leader* Period			0.104**
			(0.051)
Dishonest leader * Active leader * Period			-0.055
			(0.105)
Stage 1 performance of worker	0.333***	0.347***	0.348***
	(0.071)	(0.071)	(0.071)
Previous period group share of prize	4.592***	4.537***	4.353***
	(1.522)	(1.521)	(1.520)
Previous period prize as share of max prize	-0.898*	-0.897*	-0.600
	(0.527)	(0.527)	(0.538)
Constant	2.183***	2.316***	2.673***
	(0.687)	(0.689)	(0.703)
Number of Obs	2160	2160	2160
Log Likelihood	-3349.88	-3347.84	-3343.17

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Model 2 adds an interaction term for active and dishonest leaders. The results show that leaders who are both active and dishonest drive the increase in reported performance. That is, the significant increase in performance is caused entirely by dishonest leaders who have channels of influence at their disposal. Model 3 includes

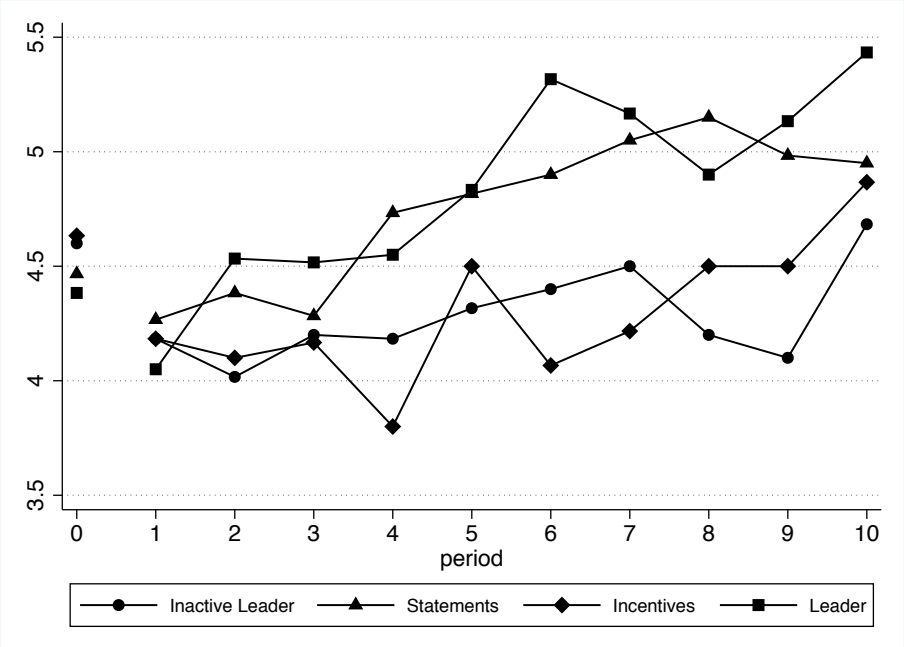
additional time trend measures. The coefficient for dishonest and active leaders remains large, and marginally statistically significant. Interestingly, the interaction between active leaders and period is now significant, indicating that workers in conditions where there are active leaders develop greater dishonesty over time, even if they are in groups with leaders who we do not categorize as dishonest.

3.3 How do leaders affect workers' honesty?

Having established that leadership can influence the degree to which workers act dishonestly, we next investigate how leaders affect workers' behavior and the relative importance of two alternative channels through which such influence potentially operates. For this, we exploit the strength of the laboratory environment, where we can turn off one channel while leaving the other active.

Figure 2 shows the average reported performance across periods in each of the four conditions, where leaders can influence financial incentives (Leader Incentives Only), leaders can make statements (Leader Statements Only), leaders have the power to do both (Leader), and leaders have a purely passive role (Inactive Leader). Again, we include the average reported performance of all subjects in the first stage, denoted as "Period 0."

Figure 2: Average group performance over time, all conditions



Qualitatively, the figure indicates that the ability to make public statements is a more important channel through which leaders influence groups than the ability to determine incentives. Average reported performance when leaders can only make statements to workers largely overlaps that of groups in the Leader condition. In contrast, both the level and the trend of group performance in the Leader Incentives Only condition follow closely that of groups in the Inactive Leader condition.[17] These results suggest that the effect of leadership on cheating derives mainly from leaders' ability to make statements to workers, rather than from their power to reward workers' reported performance.[18]

Table 4 reports results from random-effects tobit regressions of workers' individual performance. Model 1 includes a variable indicating whether the leader can communicate, another indicating the ability to allocate rewards, and the interaction of these two variables identifying when the leader can do both. The regression also controls for workers' reported performance in Stage 1. The results confirm that the ability to make public statements is the primary channel through which active leaders produce increased dishonesty, by 0.75 points, in Stage 2. The effect of incentive power on reported performance is small and statistically insignificant. Combining leaders' ability to communicate and allocate rewards further increases cheating, but not in a statistically significant way. Model 2 adds time variables, period and the interaction of period with the different conditions. Performance in early periods does not significantly differ across conditions—i.e., the condition-specific indicator variables (intercepts) do not differ significantly—and cheating tends to increase over time in all conditions. However, reported performance increases at an even higher rate over time when leaders can make statements to workers, as shown by the positive and significant coefficient on the interaction term between period and the Leader statements variable. Leaders' power to reward workers for their performance does not cause any additional

[17] In Table B.4 in the Appendix, we compare reported performance between conditions. Two-sided Mann Whitney tests show that reported performance is significantly different between the Inactive Leader and the Leader Statements Only and Leader conditions ($p=0.000$ and $p=0.000$) as well as between the Leader Incentives Only and the Leader Statements Only and Leader conditions ($p=0.000$ and $p=0.000$). But the difference between the Inactive Leader and Leader Incentives Only condition is insignificant ($p=0.734$) as well as the difference between the Leader Statements Only and the Leader condition ($p=0.144$).

[18] Aggregate payoffs follow a similar pattern: they are lowest and decrease at a faster rate in the Leader Statements Only and Leader conditions, while the Inactive Leader and Leader Incentives Only conditions also display overlapping trends, with higher and more constant payoffs over time.

increase in cheating over time, neither when it is leaders' only ability, nor when it is combined with the ability to make statements.

Table 4: Performance by treatment

Dependent variable	Stage 2 performance	
	(1)	(2)
Leader statements only	0.750**	0.021
	(0.296)	(0.384)
Leader incentives only	-0.099	-0.303
	(0.295)	(0.382)
Leader (statements x incentives)	0.363	0.299
	(0.419)	(0.543)
Period		0.063**
		(0.032)
Leader statements only *Period		0.138***
		(0.046)
Leader incentives only *Period		0.038
		(0.045)
Leader *Period		0.014
		(0.065)
Stage 1 performance	0.362***	0.362***
	(0.070)	(0.070)
Constant	3.185***	2.830***
	(0.381)	(0.419)
Number of Obs	2400	2400
Log Likelihood	-3806.52	-3753.25

Note: Random-effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Thus, confirming what we observed in Figure 2, the ability of leaders to make public statements has a much stronger influence on unethical conduct than the ability to distribute financial rewards. In the next section, we study these specific tools more thoroughly, including how leaders employ them and their direct effect on behavior.

3.4 Strategies employed by leaders

We next investigate more precisely how the strategies employed by leaders affect workers' behavior. We begin with the ability to distribute financial incentives and then analyze the role of statements.

In conditions with leader incentive power, leaders can choose how to distribute rewards among workers, after observing their reported performance. Leaders can either reward high or low reported performance, thus implicitly encouraging a

particular behavior, or they can distribute the bonus independently of workers' performance reports. At the level of a particular leader, the correlation between the bonuses allocated by the leader and workers' reported performance captures the extent to which the leader rewards and encourages misreporting. We therefore construct, as a measure of leaders' use of incentives to encourage dishonesty up to a particular period, a variable equal to the average correlation between rewards and reported performance in the worker's group up to that period. This variable ranges from -1 to +1. A positive value indicates that a leader provides a greater share of the bonus to workers reporting high performance, a negative value indicates that the leader rewards low reported performance, and a value of 0 indicates that the leader distributes the bonus independently of reported performance. The average measure across all leaders, cumulatively through the last period equals 0.095.

Table 5: Reported performance and leader's incentive use

Dependent variable	**Stage 2 performance**		
	(1)	**(2)**	**(3)**
Correlation between reward and performance up to previous period	1.313***	1.123***	1.006***
	(0.219)	(0.215)	(0.217)
Previous period performance		0.263**	0.036
		(0.130)	(0.143)
Previous period reward		-0.006	-0.013
		(0.015)	(0.015)
Previous period performance*Reward		0.002	0.003
		(0.004)	(0.004)
Previous period prize as share of max prize			-2.206***
			(0.667)
Previous period group share of prize			6.036**
			(2.397)
Constant	5.225***	4.025***	5.456***
	(0.149)	(0.566)	(0.853)
Number of Obs	1080	1080	1080
Log likelihood	-1681.76	-1666.83	-1659.97

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5 reports results from random-effects tobit regressions of workers' performance in a period on this correlation up to the previous period. Model 1 shows that a higher past correlation between rewards and reported performance yields greater misreporting. Model 2 shows that the effect of the leader's rewarding strategy

on reported performance remains significant after controlling for the worker's previous period performance, the bonus received by the worker in the previous period, and the interaction of these two variables. Model 2 also shows that workers who reported higher scores in the previous period are likely to again report high scores. In Model 3, our main result does not change if we control for the overall level of cheating that occurs within the session and in the worker's specific firm. Thus, from Table 5, we observe that leaders' use of incentives can significantly influence misreporting. The fact that, as we saw earlier, such incentive power does not significantly increase misreporting is likely due to the fact that leaders do not, generally, use incentives to encourage misreporting. Recall that the average correlation between bonus allocations to workers and their reported performance, across all leaders, is close to zero.

We next explore the effect of the content of leaders' statements on workers' reported performance. To this end, we conducted an analysis of the content of leaders' messages, relying on message classifications by three independent coders. The authors initially developed categories that distinguish, first of all, between messages encouraging *high* and *low* reported performance. Categories also further identify whether the message contains a direct request, praises a certain kind of past performance report, refers to a reward for a certain kind of reported performance, or makes a direct appeal to honesty or dishonesty. Coders observed the statement made by a particular leader in a period, and then identified which categories applied to that particular statement. In the following analysis we use the median of the answers provided by the coders.[19]

Table 6 reports results from random-effects tobit regressions of workers' reported performance in a period on the type of statements made by the leader at the start of the period. Model 1 explores the effect of leaders' explicitly requesting high or low performance from workers (*request high* and *request low*), Model 2 of praises for high or low past performance (*praise high* and *praise low*), Model 3 of messages linking reward to high or low performance (*reward high* and *reward low*), and Model 4 of

[19] Table B.4 in the Appendix reports all message categories, their definitions, and frequencies. The first eight categories are the ones that we believed, *ex ante*, would be the most relevant, so we focus our analysis on these. For completeness, we also included additional categories, not used in the current analysis, that identify messages referring to other groups' performance, to the size of the prize or to the group's share of the prize, and residual categories for messages containing apologies, jokes, general encouragement, or miscellaneous messages. Including these additional categories in the analysis does not substantively change our results (see Table B.5 in the Appendix).

messages referring to honesty or dishonesty (*honest* and *dishonest*). Model 5 combines all types of messages in the same regression, and Model 6 controls for leaders' rewarding strategy, by including the correlation between reward and performance up to the previous period, i.e., the variable from Table 5. All regressions control for the amount of misreporting occurring within the session and the group, captured by the relative size of the prize and by the group's share of the prize in the previous period, respectively, and for the worker's reported performance in the previous period. Models 3 and 6 consider only observations from the Leader condition, as this is the condition with Leader-determined incentives, while other models include observations from both conditions that allow leader statements (Leader and Leader Statements Only).

Table 6: Reported performance and content of leader statements

Dependent variable	**Stage 2 performance**					
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Request high	0.914***				0.588***	0.754***
	(0.191)				(0.217)	(0.285)
Request low	-1.313***				-1.205***	-1.812***
	(0.220)				(0.223)	(0.354)
Praise high		0.039			0.000	-0.335
		(0.227)			(0.219)	(0.302)
Praise low		-0.390			-0.226	-0.197
		(0.359)			(0.340)	(0.475)
Reward high			0.926***		0.603*	0.343
			(0.352)		(0.328)	(0.339)
Reward low			-2.975***		-1.994***	-1.672**
			(0.664)		(0.653)	(0.668)
Dishonest				0.628***	0.366*	0.300
				(0.186)	(0.202)	(0.285)
Honest				-0.721***	-0.758***	-1.280***
				(0.272)	(0.263)	(0.371)
Correlation btw reward and perf up to previous period						0.641
						(0.397)
Previous period performance	0.195**	0.190**	0.260*	0.187**	0.186**	0.286**
	(0.089)	(0.092)	(0.141)	(0.091)	(0.087)	(0.134)
Previous period prize as share of max prize	-1.461*	-2.482***	-1.508	-2.334***	-1.225	0.077
	(0.768)	(0.797)	(1.093)	(0.785)	(0.776)	(1.073)
Previous period group share of prize	2.386	2.410	9.690**	2.539	2.327	9.316**
	(2.876)	(2.994)	(3.992)	(2.946)	(2.875)	(3.825)
Constant	5.142***	6.237***	3.828***	5.932***	5.121***	2.514**
	(0.748)	(0.778)	(1.097)	(0.765)	(0.744)	(1.020)
Number of Obs	1080	1080	540	1080	1080	540
Log Likelihood	-1531.14	-1561.46	-745.21	-1553.35	-1521.00	-717.45

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

The regression coefficients confirm the influence of leaders' statements: workers' reported performance generally increases when leaders send messages

encouraging high performance and decreases when leaders encourage honesty or lower performance reports. Regardless of the specific strategy used, statements asking for lower levels of performance appear at least as effective as those asking for high scores, reflected in the relative magnitude of coefficients associated with "high" and "low" statements.

Models 5 and 6 allow us to compare the relative effectiveness of different kinds of statements. Statements directly requesting a certain performance report, those associating reward to lower performance reports and direct appeals to honesty appear to have the largest influence on workers' behavior. Such statements are the only ones that retain statistical significance when all strategies are included in the same regression.

Model 6 confirms that, in our experiment, leaders' statements continue to have large influence on worker behavior, even after accounting for the effect of incentives. Indeed, when controlling for leaders' statements, the correlation between reward and performance only marginally significantly affects workers' reported performance. Meanwhile, the magnitude and significance of coefficients associated with leader's statements are robust to the inclusion of leaders' rewarding behavior as a control.[20]

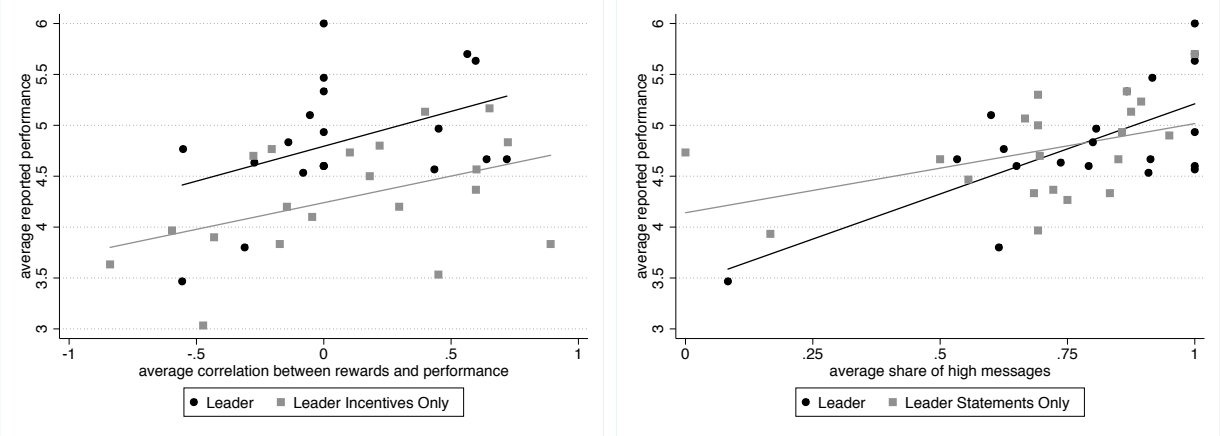
As a complement to the statistical analyses in Tables 5 and 6, Figure 3 shows the relationships between how leaders use incentives (panel A) and statements (panel B) and the average reported performance in the leader's firm across all 10 periods. More precisely, panel A depicts, for each leader, the average performance-reward correlation across all ten periods (horizontal axis) and the corresponding average reported group performance across all ten periods (vertical axis). The two kinds of markers identify the Leader and the Leader Incentives Only conditions. Panel B uses the same variable for the vertical axis, but the horizontal axis measures a general tendency to use messages encouraging high performance reports—more precisely, the relative proportions of

[20] In contrast with the analysis in Table 5, the regression in Model 6 of Table 6 also restricts the sample to only observations in the Leader condition—where both statements and incentives are available to a leader. Table 5 also includes all observations in the Leader Incentives Only condition. Running the regressions of Table 5 for the Leader condition only, we find that the coefficients on the performance-reward correlation variable are lower in magnitude, by about 0.25 points, and their standard errors are twice as large. This leads to a statistically insignificant effect of leaders' rewarding strategy when controls are included (results are shown in Table B.6 in the Appendix). The lack of significance is partly due to lower power and also likely to the fact that communication matters more than the ability to reward performance when both channels are available to leaders. See also Table B.7 in the Appendix, which shows the regression models of Table 6 only using observations from the Leader condition.

"high" and "low" messages.[21] The two kinds of markers identify, separately, the two conditions in which statements were possible (Leader and Leader Statements Only). The graphs reveal positive relationships in all conditions. Moreover, the correlation between the employed strategies and average performance is positive and significant in both panels (Incentives: r = 0.38, p=0.02; Statements: r = 0.57, p = 0.0001).

Figure 3: Effect of leaders' strategies on reported performance

A: Incentives **B: Statements**



The figure also reveals why we observe higher levels of worker dishonesty with leader statements, even though statements encouraging honest behavior are as effective as statements encouraging dishonest behavior. Leaders tend to employ more messages encouraging dishonesty. As Panel B of Figure 3 shows, most leaders tend to use more statements encouraging high performance reports—i.e., the markers tend toward the right-hand side of the figure and the proportion is above 0.5 for almost all leaders. While leaders send at least one message encouraging cheating and high performance reports 71 percent of the time, they speak in favor of honesty and low numbers only 31 percent of the time.[22] In contrast, Panel A reveals that the use of incentives is generally

[21] Specifically, this measure is constructed by counting how many of the messages sent by a leader in Stage 2 fall into a "high" message category, and dividing this number by the total number of messages by that leader that lie in both "low" and "high" categories. This yields a number between 0 and 1 that indicates the share of relevant messages sent by the leader that encourage dishonesty rather than honesty. For example, a leader who only sends messages encouraging dishonesty receives a score of 1, one who only sends messages encouraging honesty a score of 0, and one who tends to send both kinds of messages with equal frequency a score of 0.5.

[22] Moreover, leaders tend to send a greater proportion of messages requesting high performance reports over the course of the experiment (see Figure A.4 in the Appendix). This provides a partial account for the increasing trend in dishonesty in conditions with leader statements (see Sections 3.2 and 3.3).

distributed more evenly between leaders who encourage and discourage dishonesty, without a systematic tendency toward one type of behavior or the other. Hence, even though leaders can influence behavior through the distribution of incentives, they generally do not tend to do so in one particular direction. But, with their statements, leaders tend to strongly encourage misreporting.

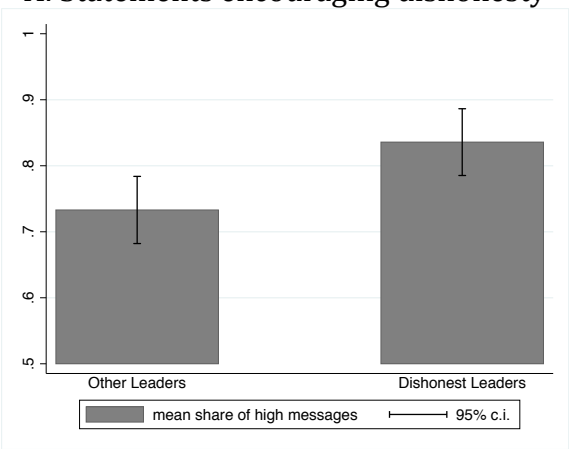
3.5 Strategies employed by unethical leaders

We next investigate the specific strategies employed by those leaders we classified as unethical—i.e., those who reported performance of 6 in Stage 1. In particular, we study whether unethical leaders are more likely to employ strategies encouraging unethical conduct than are other leaders.

Figure 4 depicts the relationship between leaders' dishonesty and their behavior. Panel A shows the mean share of "high" statements made by leaders across Stage 2. The use of statements encouraging dishonesty is significantly higher for dishonest leaders (two-sided Mann Whitney test: p=0.047). In Panel B, we find that a similar relationship holds for how the two types of leaders employ incentives. While most leaders, on average, exhibit no systematic relationship between the allocation of rewards and workers' reported performance (r=-0.02, p=0.645), the relationship is positive and significant for dishonest leaders (r=0.29, p=0.0001).

Figure 4: Leader's honesty and leader behavior

A: Statements encouraging dishonesty



B: Incentives encouraging dishonesty

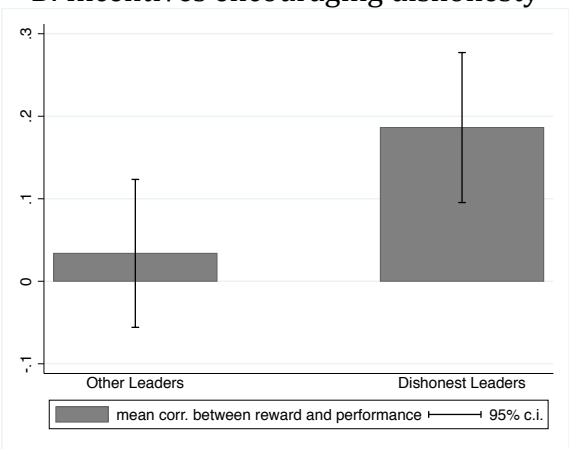


Table 7 reports results from random-effects linear regressions of leaders' strategies on the indicator of leader dishonesty, period, the firm's share of the prize, and size of the overall prize relative to the maximum prize. Dependent variables are the share of statements made by the leader requesting high performance in a period in Model 1, and the correlation between rewards allocated by the leader and workers' performance in a period in Model 2. Model 1 considers all groups in conditions allowing leader statements, Model 2 those groups in incentives conditions.[23]

Table 7: Leaders' honesty, context and leaders' behavior

Dependent variable	**Share of high messages (1)**	**Correlation btw reward and performance (2)**
Dishonest leader	0.113**	0.181
	(0.057)	(0.141)
Period	0.019**	0.013
	(0.008)	(0.017)
Group share of prize[a]	0.296	-1.151
	(0.441)	(1.020)
Prize as share of max prize[a]	-0.180	0.535*
	(0.183)	(0.303)
Constant	0.691***	-0.217
	(0.196)	(0.321)
Number of Obs[b]	290	400
R-squared	0.08	0.01

Note: Random effects linear regression. Robust standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. [a] Refers to previous period in Model 1 (messages are sent at start of period) and to current period in Model 2 (rewards are given at end of period). [b] The number of observations is reduced to 290 in Model 1, since there are 70 instances within periods 2-10 where neither a high nor a low message was sent

Leaders who likely misreported their performance in Stage 1, i.e., dishonest leaders, are more likely to encourage cheating through their statements. They are also more likely to reward workers who reported high performance, but the strength of this relationship is not statistically significant ($p = 0.197$). The use of statements encouraging misreporting increases over time, while there is no significant relationship between time and the correlation between reward and performance. These different trends in the use of communication and rewarding strategies help explain why cheating

[23] Since leaders send messages to workers at the beginning of the period, while they allocate rewards at the end of the period, group share of the prize and size of the prize are lagged in Model 1, while they refer to the current period in Model 2.

increases over time with leader statements, but not when leaders can distribute financial incentives.

3.6 Do leaders affect social norms of conduct?

Finally, we also attempt to identify whether an effect of leadership on followers extends to a broader change in perceptions of appropriate an inappropriate conduct. To this end, we included a measure, at the end of the experiment, which elicited workers' social norms regarding the appropriateness of misreporting the outcome of the die roll in Stage 1. We used the incentivized norm elicitation method introduced by Krupka and Weber (2013). At the end of each session, subjects were asked to rate the appropriateness of overstating one's performance in Stage 1, on a scale from "very inappropriate" (1) to "very appropriate" (4).[24] Subjects were rewarded if their answer matched that of a randomly drawn other participant in the session. This procedure captures the social perceptions of appropriateness, a central component of injunctive social norms (see Burks and Krupka, 2012; Krupka and Weber, 2013).

[24] Specifically, subjects were asked, "Suppose that, in Stage 1, someone rolled a 1 on his or her die. How appropriate would it have been for that participant to report a higher number than 1 in Stage 1 of the experiment, when earnings were based on individual performance level and on the individual performance level of other participants?" and selected from four possible responses: "very socially inappropriate" (1), "somewhat socially inappropriate" (2), "somewhat socially appropriate" (3), and "very socially appropriate" (4). We also asked three additional questions, with a focus on norms of behavior in Stage 2 and perceptions of specific group members (see instructions in Appendix D). Our primary interest, however, is in the broad perception captured by this first question.

Figure 5: Effect of leadership on social appropriateness of misreporting

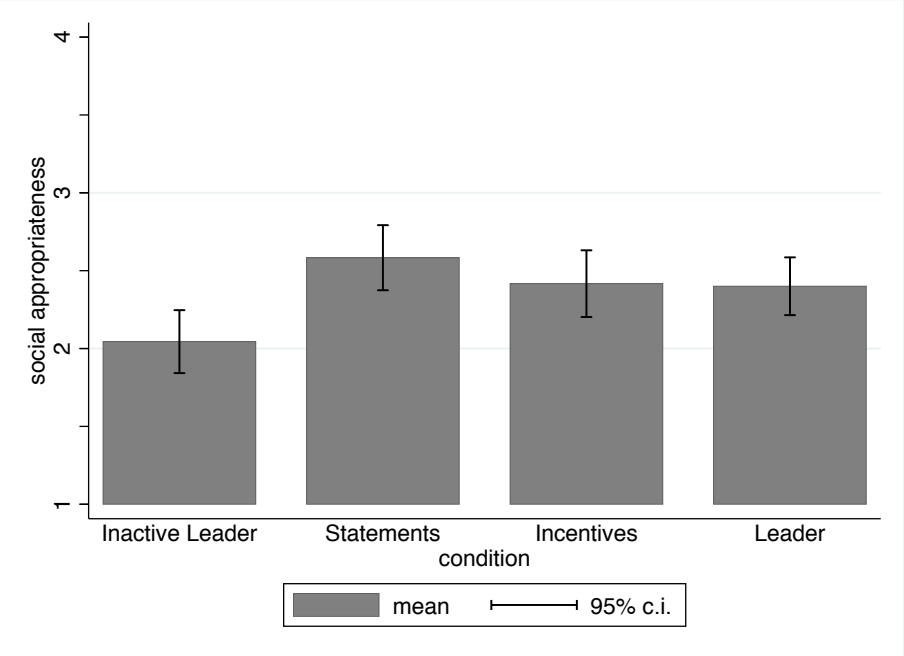


Figure 5 shows the mean reported rating of the appropriateness of inflating performance reports. Being in any condition with active leaders yields perceived norms of conduct that are more lax with respect to misreporting. That is, the difference between the Inactive Leader condition and the other three conditions is statistically significant.[25] Thus, exposure to a leader who has some channel through which to exert influence on the group changes workers' perceptions regarding the appropriateness of acting unethically in other environments, where the leader is not active. That is, our findings suggest that leaders do more than change behavior by exerting direct influence; they may also change norms and values.[26]

4. Conclusion

In this paper, we report a controlled laboratory experiment indented to study how leaders influence the unethical conduct of followers. As we note in the Introduction, the ability of researchers to address such questions using natural data is complicated by the hidden nature of unethical conduct, as well as by endogeneity issues

[25] Pair-wise Mann-Whitney tests reveal significant differences between the Inactive Leader and any other condition: Inactive Leader vs. Leader Statements Only (p=0.0003), Inactive Leader vs. Leader Incentives Only (p=0.013), and Inactive Leader vs. Leader (p=0.007).

[26] However, we do not find a significant difference between the appropriateness rating of workers who were led by a dishonest leader compared to those who were led by an honest leader.

that make causal inferences regarding the effects of leadership difficult. The laboratory environment allows us to address many of these concerns, while employing a task that incorporates features of real-world unethical conduct.

Our first main finding is clear evidence that unethical leaders produce unethical behavior on the part of followers. Even though we only observe Stage 1 unethical conduct imperfectly, a classification of leader "types" based on this behavior has a strong explanatory power for how much workers misreport their performance when in groups with active leaders. Two features of our experiment make this finding especially important. First, leaders are appointed at random, which means that the effect of unethical leaders on workers is causal—the selection and endogeneity issues present in the field are eliminated in our laboratory setting. Second, followers are never informed of the leader's Stage 1 behavior. Thus, the effect of leaders must be through what actions they take in their functions as leaders—making statements to workers and distributing incentives. Indeed, we also show that leaders who are more likely to have misreported high performance in the first stage are more likely to employ strategies that encourage misreporting, particularly communication, and that the use of such strategies yields unethical follower conduct.

Our experimental design also allows us to compare the relative importance of how leaders use statements and incentives to influence followers. Our data indicate that "what leaders say" is more important than "what they pay" (cf. Brandts and Cooper, 2007; Brandts, et al., forthcoming). That is, leaders' ability to make public statements to followers—a common function of leadership—has a stronger effect on misreporting than the ability to influence workers' earnings. The content of such statements directly influences unethical behavior: leaders who make statements indicative of a desire for more misreporting obtain such behavior, while those who request the opposite yield greater honesty. Moreover, the use of these two kinds of statements is highly asymmetric—leaders tend to employ more statements requesting higher "performance," particularly over time, and this produces greater dishonesty among followers. While the ability to distribute incentives also has an effect on unethical conduct, leaders rely on this mechanism less to encourage unethical conduct, and its aggregate effect is therefore weaker.

Importantly, we find that leaders' statements and incentive use can be effectively employed to change follower behavior in both directions; that is, both to increase and to

decrease worker misreporting. Thus, both mechanisms present potential opportunities for leaders interested in curbing unethical conduct in their organization. The trick appears, largely, to get leaders to use these techniques at their disposal—and, particularly, to employ public statements that discourage unethical conduct. Our results suggest that a key aspect of this is finding the "right" leaders—i.e., those who act ethically themselves and are likely to employ these instruments to encourage ethical, rather than unethical, employee conduct.

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A Appendix Figures

Figure A.1: Overview of the experimental design

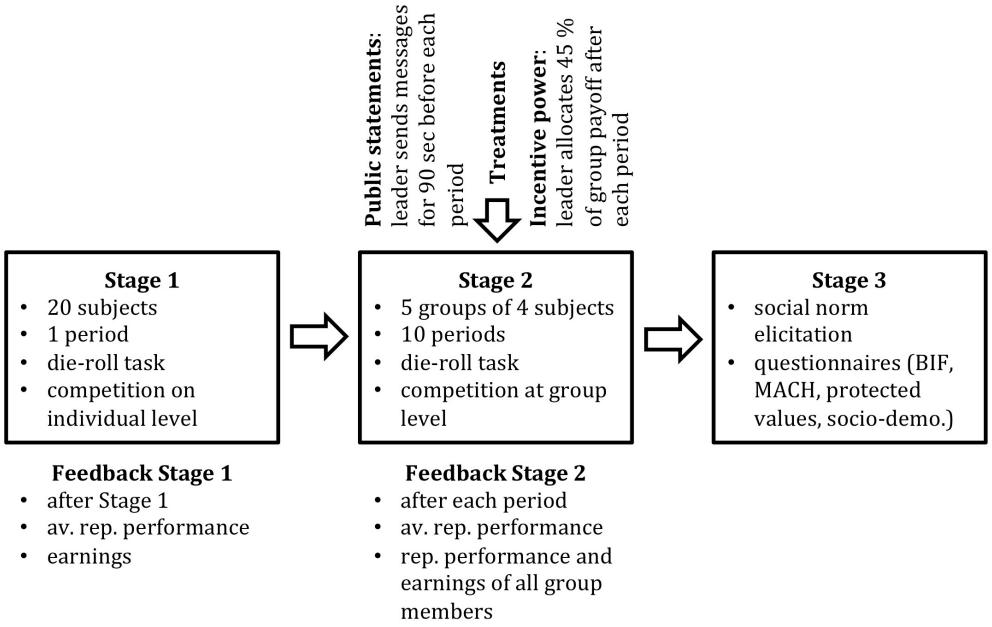


Figure A.2: Distribution of reported performance by condition in Stage 1

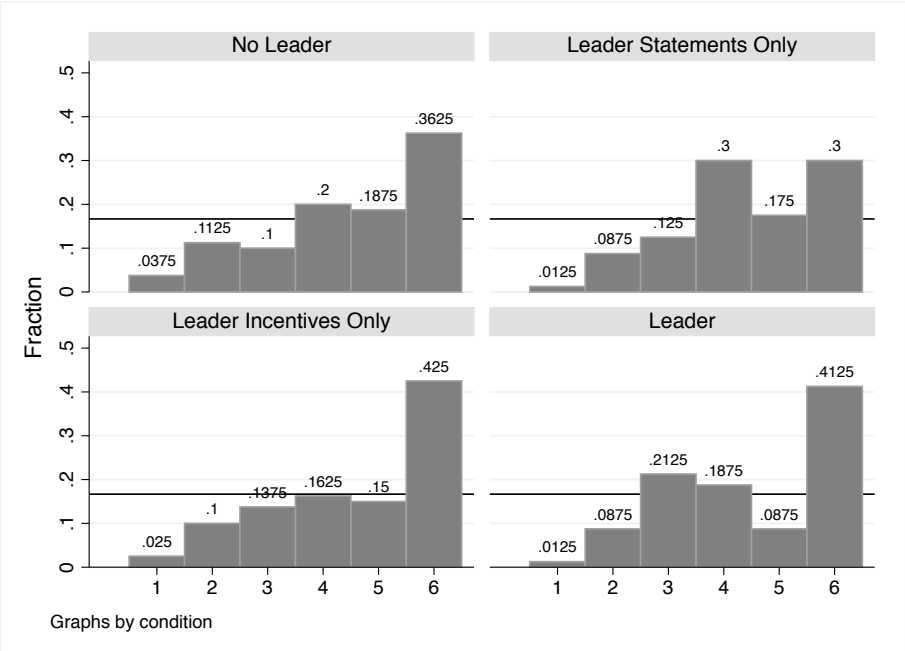


Figure A.3: Average group payoffs over time

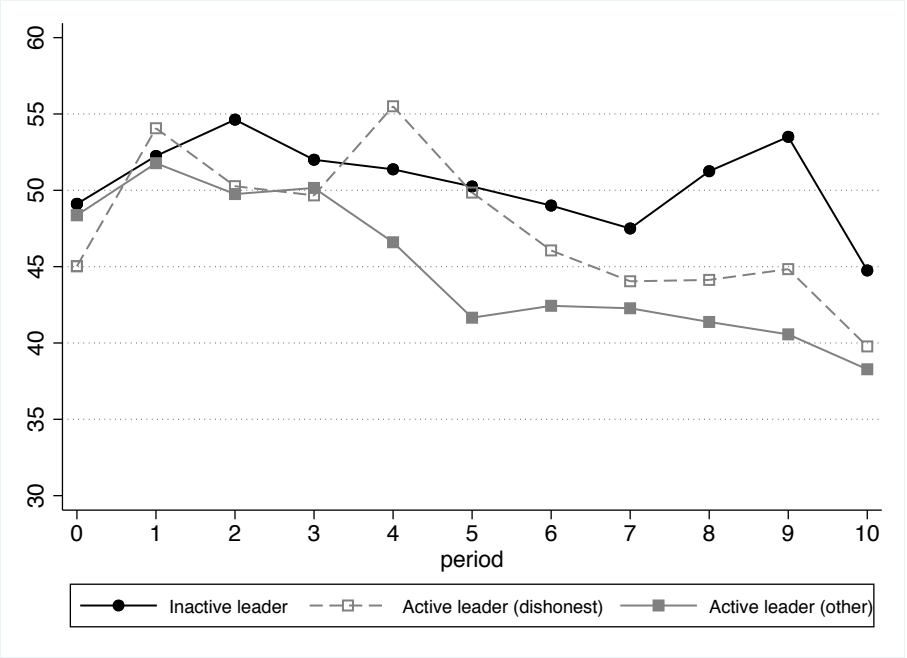
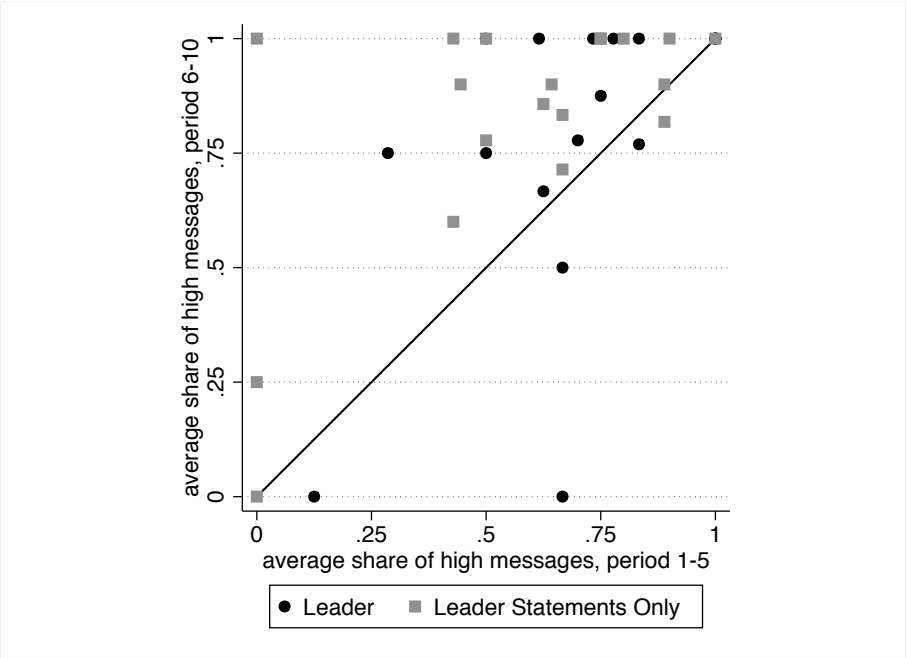


Figure A.4: Leaders' statement content over time



B Appendix Tables

Table B.1: Summary statistics

Variable	All	Inactive Leader	Leader Statements Only	Leader Incentives Only	Leader
Age	20.51	21	19.72	20.49	20.65
	(2.96)	(3.51)	(1.99)	(3.28)	(2.54)
Male (%)	56.15	50	57.14	60	49.75
	(.50)	(.50)	(.49)	(.49)	(.50)
Economics student (%)	40.62	42.5	31.25	48.75	40
	(.49)	(.50)	(.47)	(.50)	(.49)
Disposable monthly income (GBP)	251	265	257	283	200
	(175)	(171)	(178)	(204)	(131)
Big five conscientiousness	50	51.67	49.18	48.67	50.48
	(9.29)	(8.83)	(10.23)	(9.67)	(7.99)

Table B.2: Differences with expected distribution in Stage 1

		Reported performance (in percent)						
Condition	**N**	**1**	**2**	**3**	**4**	**5**	**6**	**mean**
Inactive Leader	80	3.8%***	11.3%	10.0%*	20.0%	18.8%	36.3%†††	4.48
Leader	80	1.3%***	8.8%**	21.3%	18.8%	8.8%**	41.3%†††	4.49
Statements	80	1.3%***	8.8%**	12.5%	30.0%†††	17.5%	30.0%†††	4.44
Incentives	80	2.5%***	10.0%*	13.8%	16.3%	15.0%	42.5%†††	4.59

Stars (crosses) refer to significance levels of one-sided binomial probability test that the observed frequency is smaller (larger) than the expected frequency of 16.7%. *(†) 10%-level, **(††) 5%-level, and *** (†††) 1%-level.

Table B.3: Individual characteristics and performance in Stage 1

Dependent variable	Stage 1 performance (1)
Economics student	0.554**
	(0.266)
Male	1.244***
	(0.266)
Age	-0.116***
	(0.032)
Big Five conscientiousness score	0.035**
	(0.015)
Constant	4.775***
	(1.159)
Number of Obs	300
Log-likelihood	-489.40

Notes: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%. The number of observations is 300 instead of 320 (full sample), since we could not elicit the Big Five scores in one session because of technical problems.

Table B.4: Average reported performance in Stage 2

	Inactive Leader	Leader	Leader Incentives Only	Leader Statements Only
Average	4.28	4.84	4.29	4.75
Std.dev.	1.65	1.46	1.53	1.46
N	600	600	600	660

Table B.4: Message categories' definitions and use

Message type	Definition	Frequency
Request high	Supervisor requests an individual worker, several workers, or the entire group to report a high number, i.e., a number that is higher than 3.5 on average.	.57
Request low	Supervisor requests an individual worker, several workers, or the entire group to report a low number, i.e., a number that is lower than or equal to 3.5 on average.	.17
Praise high	Supervisor praises an individual, several individuals, or the entire group for reporting a high number, i.e., a number that is higher than 3.5 on average.	.16
Praise low	Supervisor praises an individual, several individuals, or the entire group for reporting a low number, i.e., a number that is lower than or equal to 3.5 on average.	.05

Reward high	Supervisor refers to how the bonus will be distributed in a way that gives workers a financial incentive to report a high number, i.e., a number that is higher than 3.5 on average.	.19
Reward low	Supervisor refers to how the bonus will be distributed in a way that gives workers a financial incentive to report a low number, i.e., a number that is lower than or equal to 3.5 on average.	.03
Dishonest	Supervisor refers to dishonest behavior in the message.	.39
Honest	Supervisor refers to honest behavior in the message.	.12
Ref. other groups	Supervisor refers to other groups, or other groups' behavior in a previous period.	.42
Ref. prize	Supervisor refers to the size of the prize in a previous period.	.24
Ref. earnings	Supervisor refers to the group's earnings in a previous period.	.31
Humor	Supervisor makes a joke or the message is ironic or humorous.	.13
Apology	Supervisor apologizes for his or her messages or bonus distribution in a previous period.	.04
Encouragement	Supervisor sends a message that includes a form of general encouragement.	.36
Miscellaneous	Supervisor sends a message that does not belong in any of the other categories.	.07
No message	Supervisor sends no message.	.07

Note: Frequency is defined as number of messages per group and period divided by the total number of messages, which is 400 messages for the Leader and Leader Statements Only conditions. The bonus categories refer only to observations of the Leader condition with a total number of 200 messages. The messages were classified by three independent coders, paid students, according to the provided categories.

Table B.5: Placebo regressions, leaders' communication and workers' behavior

Dependent variable	Stage 2 performance					
	(1)	(2)	(3)	(4)	(5)	(6)
Total no. of characters sent by leader during period	-0.001					
	(0.001)					
Total no. of messages sent by leader during period		-0.005				
		(0.040)				
Humor			0.673**			
			(0.286)			
Apology				-0.191		
				(0.422)		
Encouragement					-0.029	
					(0.189)	
Miscellaneous						0.234
						(0.371)
Previous period performance	0.188**	0.189**	0.182**	0.189**	0.189**	0.188**
	(0.092)	(0.092)	(0.091)	(0.092)	(0.092)	(0.092)
Previous period prize as share of max prize	-2.598***	-2.604***	-2.438***	-2.592***	-2.582***	-2.610***
	(0.788)	(0.792)	(0.789)	(0.788)	(0.793)	(0.789)
Previous period group share of prize	2.734	2.629	2.408	2.586	2.687	2.681
	(2.982)	(2.971)	(2.969)	(2.972)	(2.994)	(2.972)
Constant	6.315***	2.264***	6.153***	6.280***	6.255***	6.258***
	(0.783)	(0.086)	(0.774)	(0.775)	(0.778)	(0.775)
Number of Obs	1080	1080	1080	1080	1080	1080
Log Likelihood	-1561.96	-1562.04	-1559.23	-1561.95	-1562.04	-1561.85

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B.6: Leaders' rewarding strategy and performance in the Leader condition

Dependent variable	Stage 2 performance		
	(1)	(2)	(3)
Correlation between reward and performance up to previous period	1.035**	0.778*	0.767*
	(0.500)	(0.430)	(0.444)
Previous period performance		0.406*	0.081
		(0.243)	(0.273)
Previous period reward		-0.019	-0.024
		(0.029)	(0.029)
Previous period Performance*Reward		0.005	0.006
		(0.007)	(0.007)
Previous period prize as share of max prize			-1.940*
			(1.134)
Previous period group share of prize			9.453**
			(4.076)
Constant	5.934***	3.852***	4.783***
	(0.236)	(1.106)	(1.540)
Number of Obs	540	540	540
Log Likelihood	-773.79	-757.36	-754.16

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

Table B.7: Leaders' communication strategy and performance in Leader condition

Dependent variable	Stage 2 performance					
	(1)	(2)	(3)	(4)	(5)	(6)
Request high	1.142***				0.732**	0.754***
	(0.252)				(0.285)	(0.285)
Request low	-1.991***				-1.845***	-1.812***
	(0.344)				(0.355)	(0.354)
Praise high		-0.090			-0.273	-0.335
		(0.324)			(0.300)	(0.302)
Praise low		-0.586			-0.257	-0.197
		(0.522)			(0.475)	(0.475)
Reward high			0.926***		0.425	0.343
			(0.352)		(0.337)	(0.339)
Reward low			-2.975***		-1.731***	-1.672**
			(0.664)		(0.669)	(0.668)
Dishonest				0.758***	0.338	0.300
				(0.270)	(0.284)	(0.285)
Honest				-1.118***	-1.251***	-1.280***
				(0.391)	(0.371)	(0.371)
Correlation between reward and performance up to previous period						0.641
						(0.397)
Previous period performance	0.283**	0.312**	0.260*	0.333**	0.289**	0.286**
	(0.135)	(0.149)	(0.141)	(0.148)	(0.134)	(0.134)
Previous period prize as share of max prize	-0.458	-1.464	-1.508	-1.093	0.197	0.077
	(1.058)	(1.143)	(1.093)	(1.135)	(1.070)	(1.073)
Previous period group share of prize	8.152**	9.487**	9.690**	9.474**	9.467**	9.316**
	(3.849)	(4.112)	(3.992)	(4.036)	(3.840)	(3.825)
Constant	2.921***	3.723***	3.828***	3.167***	2.445**	2.514**
	(1.021)	(1.137)	(1.097)	(1.124)	(1.020)	(1.020)
Number of Obs	540	540	540	540	540	540
Log-likelihood	-728.23	-756.17	-745.21	-749.34	-718.78	-717.45

Note: Random effects tobit regression. Standard errors in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%

C Mathematical Appendix

First stage (individual task)

In contrast to Section 3, we denote the player's reported performance level with $\tilde{p}_i$ and the true outcome of the die roll with p_i. Then, a player's profit is given by:

$$\pi_i(\tilde{p}_i, \tilde{p}_{-i}) = s_i(\tilde{p}_i, \tilde{p}_{-i}) V(\tilde{p}_i, \tilde{p}_{-i})$$

$$\text{with } s_i(\tilde{p}_i, \tilde{p}_{-i}) = \frac{\tilde{p}_i}{\tilde{p}_i + \sum_{j=1, i \neq j}^{N-1} \tilde{p}_j},$$

$$\text{and } V(\tilde{p}_i, \tilde{p}_{-i}) = \begin{cases} a, & \text{if } \frac{\sum_{i=1}^{N} \tilde{p}_i}{N} \leq \mu, \\ a - b\left(\frac{\tilde{p}_i + \sum_{j=1, i \neq j}^{N-1} \tilde{p}_j}{N} - \mu\right), & \text{if } \frac{\sum_{i=1}^{N} \tilde{p}_i}{N} > \mu. \end{cases}$$

The incentive for each player *i* to report a higher performance level than the one drawn from the random distribution is denoted by $\Delta = \pi_i(\tilde{p}_i + 1) - \pi_i(\tilde{p}_i)$ and depends on the other players' reported performance levels. Therefore we have to distinguish between the following cases: (i) Assume all other players' reported performance levels are such that $\frac{\sum_{i=1}^{N} \tilde{p}_i}{N} \leq \mu$ holds, then reporting a higher performance can either (a) increase the reported average performance such that it is higher than the expected performance level μ or (b) the average reported performance remains lower than the expected performance. (ii) Assume all players' reported performance levels are such that $\frac{\sum_{i=1}^{N} \tilde{p}_i}{N} > \mu$ holds, independent of $\tilde{p}_i$.

We can show that for the parameter choice of a=1250, b=300, for the distribution of $\tilde{p}_i \in \{1, \dots, 6\}$, and for N=20 players, the incentive to deviate is positive in all cases. Hence, we have no inner equilibrium and all players will report the highest possible performance level of $\tilde{p}_i = 6$.

Second stage (group task)

Each of the firms $f \in \{1, \dots, F\}$, consists of n players $i \in \{1, \dots, n\}$, with $n - 1$ of them being workers and one being the leader. As in stage 1, each worker randomly draws a performance level, which is private information to each worker. The leaders are inactive players. Each worker is then asked to report her performance level $\tilde{p}_i$. The firm's performance corresponds to the average performance reported by the three workers, $\tilde{p}_f = \frac{\sum_{i=1}^{n-1} \tilde{p}_i}{n-1}$. Each player's payoff is a share $x_{i,f}$ of the firm's payoff with $x_{i,f} \in [0.1, \dots, (1 - \frac{1}{n}) - (n-2)0.1]$, since a worker can receive any share between 0.1 and $((1 - \frac{1}{n}) - (n-2)0.1)$ of the firm's payoff in the conditions, in which leaders have the power to give financial incentives. They can freely distribute a share of $((1 - \frac{1}{n}) -$

$(n-1)0.1)$ of the firm's payoff among the workers. The leader receives in all conditions a share of $\frac{1}{n}$- of the firm's payoff and in the Inactive Leader and the Leader Statements Only condition each worker receives $\frac{1}{n}$-th as well. A worker's payoff is therefore:

$$\pi_i(\tilde{p}_f, \tilde{p}_{-f}) = x_{i,f}\ s_f\big(\tilde{p}_f, \tilde{p}_{-f}\big)V(\tilde{p}_f, \tilde{p}_{-f})$$

$$\text{with } s_f(\tilde{p}_f, \tilde{p}_{-f}) = \frac{\tilde{p}_f}{\tilde{p}_f + \sum_{g=1, f\neq g}^{F-1} \tilde{p}_g},$$

$$\text{and } V(\tilde{p}_f, \tilde{p}_{-f}) = \begin{cases} a, & \text{if } \frac{\sum_{f=1}^{F} \tilde{p}_f}{F} \leq \mu, \\ a - b\left(\frac{\tilde{p}_f + \sum_{g=1, f\neq g}^{F-1} \tilde{p}_g}{F} - \mu\right), & \text{if } \frac{\sum_{f=1}^{F} \tilde{p}_f}{F} > \mu. \end{cases}$$

The incentive for each player *i* to report a higher performance level than the one drawn from the random distribution depends on the other players' reported performance levels. The incentive is denoted by $\Delta = \pi_i(\tilde{p}_f + \frac{1}{n-1}) - \pi_i(\tilde{p}_f)$. Note that reporting a one unit higher performance level results in an increase of $\frac{1}{n-1}$ of the average reported performance level of this player's group. Therefore, we have to distinguish between the following cases: (i) Assume all firms' reported performance levels are such that $\frac{\sum_{f=1}^{F} \tilde{p}_f}{F} \leq \mu$ holds, then reporting a higher performance can either (a) increase the reported average performance that it is higher than the expected performance level μ or (b) the average reported performance remains lower than the expected performance. (ii) Assume all other firms' average reported performance levels are such that $\frac{\sum_{f=1}^{F} \tilde{p}_f}{F} > \mu$ holds independent of the average reported performance level of this group $\tilde{p}_f$.

We can show that for our parameter choice of a=1250, b=300, for the boundaries of the distribution of $\tilde{p}_i \in \{1, \dots, 6\}$, for F=5 groups, and n=4 players per group, the incentive to deviate is positive in all cases. Hence, we have no inner equilibrium and all players will report the highest possible performance level of $p_i^r = 6$.

D Instructions

Thank you for participating in today's experiment.

I will read through a script to explain to you the nature of today's experiment as well as how to navigate the computer interface with which you will be working. I will use this script to make sure that the information given in all sessions of this experiment is the same.

In addition to a GBP 2.50 payment that you receive for your participation, you will be paid money that you accumulate from the decision tasks that will be described to you in a moment. The exact amount you receive will be determined during the experiment and will depend on your decisions and the decisions of others. You will be paid privately, in cash, at the conclusion of the experiment.

All monetary amounts you will see in this experiment will be denominated in ECUs or Experimental Currency Units. We will convert ECUs into GBP at the rate of

35 ECUs = 1 GBP.

If you have any questions during the experiment, please raise your hand and wait for an experimenter to come to you.

Please do not talk, exclaim, or try to communicate with other participants during the experiment.

Do not use the computer in a way not specified by these instructions or by the experimenters.

Participants intentionally violating the rules may be asked to leave the experiment with only their participation payment.

All numerical examples in these instructions are used simply to provide examples and do not represent any hints or suggestions for how you should make your decisions during the experiment.

The experiment

The experiment consists of two stages. There are 20 participants in today's experiment. You and all other 19 participants will take part in a decision task in each of these two stages What happens in each stage will not affect the procedures or your earnings in the other stage. You will receive separate instructions for each stage, once we reach that stage of the experiment.

INSTRUCTIONS ON STAGE 1

In the first stage of the experiment all participants will participate together in a single decision task. This task will only be performed once.

The task

In the task, each participant in the experiment will roll a die privately and individually to determine his or her "individual performance." A participant's performance represents how well the participant performed the task. In this task, higher scores represent better performance.

A 6-sided die and a cup were provided to each participant before the start of the experiment. Each of you will roll the die inside the cup privately to determine your individual performance. You should roll the die in a way that no other participant observes the outcome of your die roll. The experimenter will now demonstrate how you can roll the die so that only you can observe the outcome. Afterward, please try rolling the die several times, to practice this procedure and to verify that you received a fair die.

After rolling the die, each participant will report his or her individual performance on the computer screen. Note that there is no way for anyone, neither the experimenter nor other participants, to verify the actual individual performance (die roll) of any participant. Therefore, all payoffs will be based on the level of individual performance that is reported by each participant. Your payoff in the task will be determined by the performance you report and by the performance reported by others.

Payoffs

Each participant's payoff for the task then depends on the performance level reported by that participant and on the performance level reported by all other participants. In particular, the reported individual performance levels of all participants determine the **size of the total prize** available for performing the task and each participant's reported individual performance level determines that **participant's share of the prize**. This share, multiplied by the size of the total prize, is then that participant's **payoff** for the task.

Specifically, each participant's payoff is calculated as follows:

1. **Size of the prize**: The size of the total prize depends on the average reported individual performance level of all participants, including you. The prize is largest, equal to 1250 ECU, when the average reported performance level is not higher than the expected average performance level from rolling a die, or 3.5. If everyone rolls their die and reports the observed performance level, one would expect an average score of 3.5 (this is the average of the numbers, 1, 2, 3, 4, 5 and 6). If the average reported performance level is 3.5 or lower, the total size of the prize will be fixed at 1250 ECU. But a higher average reported performance level will lower the size of the prize.
   The table below shows how the prize varies with the average reported performance level. The average reported performance level is calculated by adding the

performance levels reported by all participants and then dividing this sum by the number of participants, which is equal to 20

Average reported performance level of all participants	Size of the prize	Prize in ECU
1	100%	1250
1.5	100%	1250
2	100%	1250
2.5	100%	1250
3	100%	1250
3.5 *(expected)*	100%	1250
4	88%	1100
4.5	76%	950
5	64%	800
5.5	52%	650
6	40%	500

The exact size of the prize is determined by the following formula:

If the average reported performance level is less than or equal to 3.5 (expected average performance level):

Prize = 1250

If the average reported performance level is greater than 3.5 (expected average performance level):

Prize = 1250 – 300 x (average reported performance level – 3.5)

That is, for every unit by which the average reported performance level is above 3.5, the size of the prize decreases by 24 percent.

2. **Your share of the prize**: Each participant's share of the total prize is determined by the ratio of that participant's reported performance level and the sum of reported performance levels of all participants.

$$\text{Share of the prize} = \frac{\text{Own reported performance level}}{\text{Sum of reported performance levels of all participants}}$$

Thus, for any total size of the prize, your share of the prize is greater when your reported performance level is greater.

3. **Your payoff**: Each participant's payoff is calculated by multiplying the size of the prize by that participant's share of the prize.

$$\text{Your payoff} = (\text{Size of the prize}) \times (\text{Your share of the prize})$$

Are there any questions about how the size of the prize, shares of the prize, or payoffs will be determined in stage 1? Remember that if you have a question at any point during the experiment, you should raise your hand and wait for the experimenter to come to you.

Feedback

At the end of Stage 1, you will see a screen that shows you:

- Your reported performance level
- The average reported performance among all participants
- The size of the prize
- Your share of the prize
- Your payoff

Examples

We will now go through some examples to make sure that it is clear to everyone how payoffs are determined.

Example 1:

Suppose that your reported performance level is **5**, the sum of all participants' performance levels, including yours, is **100**, and the average performance level of all 20 participants is **5**.

In this case:

- The total prize is 800 ECU (i.e., 1250 ECU – 300 ECU (5 – 3.5) = 800 ECU). The prize is smaller than 1250 ECU because the average performance level of all participants (5) is greater than 3.5
- Your share of the prize is 5/100 = 0.05.
- Your payoff for this task is then 800 ECU x 0.05 = 40 ECU.

Example 2:

Now suppose that your reported performance level is **3**, the sum of all participants' performance levels, including yours, is **70**, and the average performance level of all participants is **3.5**.

In this case:

- The total prize is 1250 ECU because the average performance level of all participants (3.5) is equal to 3.5.
- Your share of the prize is $3/70 \cong 0.043$.
- Your payoff for this task is then 1250 ECU x $0.043 \cong 53.8$ ECU.

Note that in this and following examples we round numbers to one decimal place for calculations. However, the computer will calculate numbers exactly.

Practice questions

Before we begin with Stage 1, in which you will perform the above task one time, we will first ask you to answer some practice questions about payoffs. This is done to make sure that everyone understands how payoffs are calculated.

Please click "OK" on your screen now, to see the practice questions, and try to answer them. If you have a question or are confused, please raise your hand and wait for the experimenter to come to you.

As soon as everyone has answered the practice questions correctly, Stage 1 will start.

{PRACTICE QUESTION STAGE 1, on screen}

Please answer the questions below.

If you need help, the instructions contain detailed explanations of how to determine each answer. For example, to determine the size of the prize in the first question, please refer to the section of the instructions titled "**Size of the Prize**."

If you have a question, please raise your hand.

Suppose a participant reports her performance level to be **4**, the sum of the reported performance levels of all 20 participants is **80**, and the average performance level of all participants is **4**.

What is the **prize in ECU**?

What is that participant's **share of the prize**?

What is that participant's **payoff** in stage 1?

INSTRUCTIONS ON STAGE 2

The second stage of the experiment consists of 10 periods.

Groups and roles

At the beginning of the stage you will be randomly matched with three other participants. You and these participants will form a group consisting of four participants. The computer will randomly decide who is matched together, using randomly assigned ID numbers. The matching process is not affected by anything that happened in stage 1. At no time will your true identity be revealed to the other participants with whom you are matched, nor will you ever know the identity of these participants. You remain matched with the same three participants for all 10 periods of stage 2.

All groups will participate in a decision task in every period of stage 2.

The four participants in each group will be randomly assigned to roles by the computer. The computer will randomly select one member of each group to be the **supervisor** of the group. The remaining three participants will perform the task for the group, as **workers**.

We will now describe how the workers perform the task, how the prize and each group's share of the prize are determined, the function of the supervisor, and how supervisor and worker payoffs are determined in stage 2.

The task for workers

The task will be different for the supervisors and for the workers. We will first describe the task for workers and will later describe the role of supervisors.

Like in stage 1, each participant in the role of a worker will privately and individually roll a 6-sided die inside a cup to determine his or her individual performance level. After rolling the die each worker will then report his or her individual performance level on the computer screen.

Then, the computer will add up all reported performance levels within each group to determine the **average reported performance** for each group. The average reported performance level of a group represents how well the workers in that group report having collectively performed the task.

A group's payoff

The group's payoff in a period depends on the group's reported average performance level and on the average reported performance levels of all of the other groups.

In particular, the average reported performance level across all groups determines the **size of the total prize** available for performing the task. Each group's performance level determines that **group's share of the prize**. This share, multiplied by the total prize, is that **group's payoff**. This group payoff is then divided between all four members of that group, the supervisor and the three workers.

Specifically, each group's total payoff is calculated as follows:

1. **Size of the prize**: The size of the total prize depends on the average of the reported group performance levels of all of the groups, including your group. The prize is largest, equal to 1250 ECU, when the average reported group performance level of all groups is not higher than the expected average performance level from rolling a die, or 3.5. If all workers in a group roll their die and report the observed performance level, one would expect an average group performance score of 3.5. If this is the case for all groups, then one would also expect an average reported group performance level of 3.5 across all groups. If the average reported group performance level is 3.5 or lower, the total size of the prize will be fixed at 1250 ECU. But a higher average reported group performance level will lower the size of the prize.

   The table below shows how the prize varies with the average reported group performance level of all groups. This table is the same as in stage 1. The average reported group performance level of all groups is calculated by adding up the average reported performance levels reported by all groups, and then dividing it by the number of groups, which is equal to 5.

Average reported group performance level of all groups	**Size of the prize**	**Prize in ECU**
1	100%	1250
1.5	100%	1250
2	100%	1250
2.5	100%	1250
3	100%	1250
3.5 (*expected*)	100%	1250
4	88%	1100
4.5	76%	950
5	64%	800
5.5	52%	650
6	40%	500

The exact size of the prize is determined by the following formula:

If the average reported group performance level is less than or equal to 3.5 (expected average performance level):

Prize = 1250

If the average reported group performance level is greater than 3.5 (expected average group performance level):

Prize = 1250 – 300 x (average reported group performance level of all groups – 3.5)

That is, for every unit by which the average reported group performance level is above 3.5, the size of the prize decreases by 24 percent.

2. **Your group's share of the prize**: Each group's share of the total prize is determined by the ratio of that group's average reported performance level and the sum of the average reported group performance levels of all groups.

$$\text{Group's share of the prize} = \frac{\text{Group's average reported performance level}}{\text{Sum of average reported group performance levels of all groups}}$$

Thus, for any total size of the prize, your group's share of the prize is greater when your group's reported average performance level is greater.

3. **Your group's payoff**: Each group's total payoff is calculated by multiplying the size of the prize by that group's share of the prize.

$$\text{Your group's payoff} = (\text{Size of the prize}) \; x \; (\text{Your group's share of the prize})$$

Notice that the ways in which the size of the prize and each group's share of the prize are calculated in essentially the same way as in stage 1.

The role of the supervisor

One person in each group is in the role of supervisor. The same person in each group will be supervisor in all 10 periods of stage 2.

The group supervisor does not perform the task, but receives the same information as the group workers. In particular, the supervisor also observes the reported individual performance level of each worker in the group and the average reported group performance levels of all groups.

{**LEADER INCENTIVES ONLY & LEADER CONDITIONS:** The supervisor will also determine how part of the group's payoff is divided among the workers. Specifically, after finding out the group's payoff for a period, the supervisor will divide 45% of this total group payoff among the workers, as a "bonus." That is, **45% of the total group payoff in a round is set aside as a bonus for the supervisor to distribute among the workers**.

$$\text{Bonus} = 0.45\ x\ \text{Group's payoff}$$

The supervisor must distribute this entire bonus amount among the three workers.

To divide the bonus among the workers, the supervisor will enter a share of the bonus, as a percentage, that is to be received by each worker. For instance,

- The supervisor can give the entire bonus to one worker, by specifying that this worker receive 100 percent of the bonus and the other two workers each receive 0 percent.
- Alternatively, the supervisor can distribute the bonus equally among the three workers, by specifying that each worker receive 33.3 percent of the bonus.
- Or, the supervisor can distribute the bonus equally among only two workers, by specifying that each of these two workers receive 50 percent of the bonus and the other worker receives 0 percent.
- The supervisor can distribute the bonus in any other way among the three workers, by specifying three numbers that add up to 100 percent.

The supervisor cannot give any of the bonus to him or herself. The supervisor's own payoff is not affected by how he or she distributes the bonus among the three workers.}

{**LEADER STATEMENTS ONLY CONDITION:** At the beginning of each period, before workers roll their die and report their performance, the supervisor in each group will communicate with the workers in his or her group. **The supervisor will have 90 seconds to send messages to his or her group workers**. Messages will be sent via a chat box on the computer screen. The group workers cannot send messages to each other or to the supervisor.

When sending messages, please do not provide any information that could reveal your identity or try to elicit the identity of others and avoid using any offensive language in your messages.}

Supervisor and worker payoffs

In a period, each of the four group members – both supervisors and workers – will receive portions of the group's share of the prize. Specifically, the supervisor's and workers' portions are determined as follows:

1. **Supervisor's payoff**: In each group, the supervisor receives one fourth (25 percent) of the group's payoff. That is,

$$\text{Supervisor's payoff} = 0.25\ x\ \text{Group's payoff}$$

{**NO LEADER & LEADER STATEMENTS ONLY CONDITIONS:**

2. **Worker's payoffs**: In each group, each of the three workers will also receive one-fourth (25 percent) of the group's payoff. That is,

$$\text{Each worker's payoff} = 0.25\ x\ \text{Group's payoff}$$

The total amount received by the three workers is 75% (25% + 25% + 25%) of the group's payoff.}

{**LEDAER INCENTIVES ONLY & LEADER CONDITIONS:**

2. **Worker's payoffs**: In each group, each of the three workers will receive one-tenth (10 percent) of the group's payoff, plus any amount that is allocated to that worker by the supervisor as part of the bonus.

$$\text{Each worker's payoff} = 0.10\ x\ \text{Group's payoff} + \text{bonus awarded by supervisor}$$

Recall that the supervisor can divide 45% of the group's payoff among the workers, as a bonus, in any way that he or she desires. Each worker will therefore receive the guaranteed 10% share that each worker receives, plus a bonus between 0% and 45% of the group's payoff. A worker can therefore receive, in total, any amount between 10% and 55% percent of the group's total payoff, depending on how the supervisor chooses to divide the 45% bonus.

The total amount received by the three workers is 75% (10% + 10% + 10% + 45%) of the group's payoff.}

Are there any questions about how the size of the prize, shares of the prize, or supervisor's or workers' payoffs will be determined in stage 2? Remember that if you have a question at any point during the experiment, you should raise your hand and wait for the experimenter to come to you.

Feedback

After each period, each member of your group, the supervisor and the three workers, will find out:

- The reported individual performance levels of each worker in your group
- The average group performance level of your group

- The average group performance level of each group
- The size of the prize
- Your group's share of the prize
- Your group's payoff
- The payoff received by each member of your group, including you. {**LEADER INCENTIVES ONLY & LEADER CONDITIONS**: This will include the fixed 10 percent share and the additional bonus share, determined by the supervisor, received by each worker in your group.}

At the end of the experiment, you will be informed about your total earnings, i.e., the sum of your payoffs for stage 1 and for all 10 periods of stage 2. After the experiment your total earnings in ECU will be converted into GBP and will be paid privately, in cash, together with your participation payment.

Examples

We will now go through some examples to make sure that it is clear to everyone how payoffs are determined.

Example 1:

Suppose that your group's reported average performance level is **5**, the sum of average performance levels of all groups, including your group's average performance level, is **25**, and the average performance level of all groups is **5**.

{**LEADER INCENTIVES ONLY & LEADER CONDITIONS:** Suppose that the group supervisor decides to **divide the 45% bonus evenly** among the group workers. That is, each group worker receives 15% of the group's payoff as part of the bonus, in addition to the fixed 10% share, or 25% in total.}

In this case:

- The total prize is 800 ECU (i.e., 1250 ECU – 300 ECU (5 – 3.5) = 800 ECU). The prize is smaller than 1250 ECU because the average performance level of all groups (5) is greater than 3.5
- Your group's share of the prize is 5/25 = 0.2.
- Your group's payoff for this task is 0.2 x 800 ECU = 160 ECU.
- The supervisor's payoff is 0.25 x 160 = 40 ECU.
- {**NO LEADER & LEADER STATEMENTS ONLY CONDITIONS:** Each worker's payoff is 0.25 x 160 = 40 ECU.}

- {**LEADER INCENTIVES ONLY & LEADER CONDITIONS**: The available share for the supervisor to distribute among workers as a bonus is 0.45 x 160 ECU = 72 ECU.
- Each worker's payoff is 0.10 x 160 ECU + 72 ECU / 3 = 16 ECU + 24 ECU = 40 ECU.

Note that the first part of a worker's payoff is the fixed 10 percent that each worker receives and the second part is the portion that is allocated by the supervisor as a bonus.}

Example 2:

Now suppose that your group's average reported performance level is **3**, the sum of average performance levels of all groups, including your group's average performance level, is **17.5**, and the average performance level of all groups is **3.5**. {**LEADER INCENTIVES ONLY & LEADER CONDITIONS:** Suppose that the group supervisor decides to **give the entire 45% bonus to one of the three workers** and to give none of the bonus to the other two workers.}

In this case:

- The total prize is 1250 ECU because the average performance level of all groups (3.5) is equal to 3.5.
- Your group's share of the prize is 3/17.5≅0.17.
- Your group's payoff is 0.17 x 1250 ECU = 212.5 ECU.
- The supervisor's payoff is 0.25 x 212.5 ECU ≅ 53.1 ECU.
- {**NO LEADER & LEADER STATEMENTS ONLY CONDITIONS:** Each worker's payoff is 0.25 x 212.5 ECU ≅ 53.1ECU.}
- {**LEADER INCENTIVES ONLY & LEADER CONDITIONS**: The available share for the supervisor to distribute among workers as a bonus is 0.45 x 212.5 ECU≅ 95.6 ECU.
- One worker receives a payoff of 0.10 x 212.5 ECU + 95.6 ECU ≅ 116.9ECU.
- The other two workers receive a payoff of 0.10 x 212.5 ECU + 0 ≅ 21.3 ECU.

Note that the first part of a worker's payoff is the fixed 10 percent that each worker receives and the second part is the portion that is allocated by the supervisor as a bonus.}

Practice questions

Before we begin with Stage 2, in which you will perform the above task in groups for 10 periods, we will first ask you to answer some practice questions about payoffs. This is done to make sure that everyone understands how payoffs are calculated.

Please click "OK" on your screen now, to see the practice questions, and try to answer them. If you have a question or are confused, please raise your hand and wait for the experimenter to come to you.

As soon as everyone has answered the practice questions correctly, Stage 2 will start.

{PRACTICE QUESTION STAGE 2, on screen}

Please answer the questions below.

If you need help, the instructions contain detailed explanations of how to determine each answer. For example, to determine the size of the prize in the first question, please refer to the section of the instructions titled "**Size of the Prize**."

If you have a question, please raise your hand.

1) Suppose a participant in the role of a worker reports her performance level to be 4, and the average performance level of that participant's group is **4**. The sum of average reported group performance levels of all 5 groups is **20** and the average reported group performance level of all groups is **4**.
   {**LEADER INCENTIVES ONLY & LEADER CONDITIONS**: Suppose the supervisor decides to allocate the **entire bonus of 45% to that participant**.}
   What is the **prize in ECU**?
   What is the group's **share of the prize**?
   What is the **group's payoff** in that period?
   What is the group supervisor's payoff in that period? (Hint Button: This is one fourth (0.25) of the group's payoff.)
   {**NO LEADER & LEADER STATEMENTS ONLY CONDITIONS**: What is a group worker's payoff in that period? (Hint Button: This is one fourth (0.25) of the group's payoff.)}

   {**LEADER INCENTIVES ONLY & LEADER CONDITIONS**: What is the amount that can be allocated by the group supervisor to the group workers in that period as a bonus? (Hint Button: This is 45 percent (0.45) of the group's payoff.)
   What is the payoff of the group worker receiving the entire bonus in that period? (Hint Button: The worker receives 10 percent plus 45 percent, or 55 percent (0.55), of the group's payoff.)}

2) At the end of a period in stage 2, who is informed about a participant's reported performance level in that period?
   □ all participants in the experiment
   □ only the participant's group supervisor.
   ☒ all members of the participant's group.

INSTRUCTIONS ON STAGE 3

Stage 2 of the experiment is complete. Before concluding the experiment, you will complete several questionnaires in which you will have the possibility to earn additional ECUs.

We will next ask you and all other participants to evaluate different possible choices one might have made in stages 1 and 2 of the experiment. Specifically, we will describe a choice that a participant in the experiment might have made, and you should decide whether making that choice would be “socially appropriate” and “consistent with moral or proper social behavior” or “socially inappropriate” and “inconsistent with moral or proper social behavior.” By socially appropriate, we mean behavior that most people agree is the “correct” or “ethical” thing to do. Another way to think about what we mean is that, if someone were to make a socially inappropriate choice, then someone observing this behavior might get angry at the person who made the choice for acting in that manner.

In each of your responses, we would like you to evaluate what constitutes socially appropriate or inappropriate behavior. To give you an idea, consider the following example.

Someone is at a local cafe. While there, the person notices that someone has left a wallet at one of the tables. How appropriate would it be to take the wallet?

Very socially inappropriate	*Somewhat socially inappropriate*	*Somewhat socially appropriate*	*Very socially appropriate*
☐	☐	☐	☐

If this were the situation we asked you about in the study, you would indicate the extent to which you believe taking the wallet would be "socially appropriate" and "consistent with moral or proper social behavior" or "socially inappropriate" and "inconsistent with moral or proper social behavior". Recall that by socially appropriate we mean behavior that most people agree is the "correct" or "ethical" thing to do.

For example, suppose you thought that taking the wallet was *very socially inappropriate*. Then, you would indicate your response by selecting the first box.

For each choice you make, we will compare your response to the response of **one other participant**. **If you give the same response as** the one provided by the selected other participant**, then you will receive an additional ECU 17.5 (GBP 0.50)**. This amount will be paid to you, along with your other earnings, at the conclusion of the experiment.

For instance, in the example situation above, if your response had been "somewhat socially inappropriate," then you would receive an additional ECU 17.5 (GBP 0.50) if this

was also the response provided by a randomly selected other participant in today's session. Otherwise you would not receive any additional money for this question.

Are there any questions about this task? Once we continue, you will see detailed descriptions of the choices you are to evaluate and instructions on how to proceed.

If you have any questions at any time, please raise your hand and wait for the experimenter to come to you.

After you have answered all questions you will see how much how have earned. Then we will start another questionnaire. For answering theses further questions we will pay you an **additional ECU 70 (GBP 2.00)**. After completing the questionnaire you will be informed about your total payoff and receive your payment.

On computer screen:

Question 1: For the following question, we will compare your response to the response of **one randomly selected other participant in the session**. You will receive the additional payment if your response is the same as the one provided by the randomly selected participant in the session.

*Suppose that, in **Stage 1**, someone rolled a 1 on his or her die. How appropriate would it have been for that participant to report a higher number than 1 in Stage 1 of the experiment, when earnings were based on individual performance level and on the individual performance level of other participants?*

Very socially inappropriate	*Somewhat socially inappropriate*	*Somewhat socially appropriate*	*Very socially appropriate*
☐	☐	☐	☐

Question 2: For the following question, we will compare your response to the response of **one randomly selected other participant in the session**. You will receive the additional payment if your response is the same as the one provided by the randomly selected participant in the session.

*Suppose that, in **Stage 2**, a Worker rolled a 1 on his or her die. How appropriate would it have been for that Worker to report a higher number than 1 in Stage 2 of the experiment, when earnings were based on the group performance level of the Worker's group and on the performance level of other groups?*

Very socially inappropriate	*Somewhat socially inappropriate*	*Somewhat socially appropriate*	*Very socially appropriate*
☐	☐	☐	☐

Question 3: For the following question, we will compare your response to the response of **one randomly selected other person in your group**. That is, you will receive the additional payment if your response is the same as the one provided by one randomly selected other member of your group.

*Suppose that, in **Stage 2**, a Worker rolled a 1 on his or her die. How appropriate would it have been for that Worker to report a higher number than 1 in Stage 2 of the experiment, when earnings were based on the group performance level of the Worker's group and on the performance level of other groups?*

Very socially inappropriate	*Somewhat socially inappropriate*	*Somewhat socially appropriate*	*Very socially appropriate*
☐	☐	☐	☐

{**WORKERS**:

Question 4: For the following question, we will compare your response to the response provided in Question 3 by **the Supervisor** in your group. That is, you will receive the additional payment if your response is the same as the one provided by the Supervisor in your group when answering Question 3. For your information, we present Question 3 again, below.}

{**SUPERVISORS**:

Question 4: For the following question, we will compare your response to the response provided in Question 3 by **one randomly selected other Supervisor** in today's session. That is, you will receive the additional payment if your response is the same as the one provided by one randomly selected other Supervisor when answering Question 3. For your information, we present Question 3 again, below. }

*Suppose that, in **Stage 2**, a Worker rolled a 1 on his or her die. How appropriate would it have been for that Worker to report a higher number than 1 in Stage 2 of the experiment, when earnings were based on the group performance level of the Worker's group and on the performance level of other groups?*

Very socially inappropriate	*Somewhat socially inappropriate*	*Somewhat socially appropriate*	*Very socially appropriate*
☐	☐	☐	☐

Elicitation of Protected Values *(on computer screen)*

1) People inside a firm can sometimes make more money for themselves and for their co-workers by misreporting information to people outside the firm. That is, to benefit their firm, people may have an incentive to report having done better at their job (more sales, higher profits) than is actually true.

What is your opinion on people engaging in this kind of misreporting?

Please choose the appropriate category. That is:

very immoral ☐ ☐ ☐ ☐ ☐ ☐ ☐ very moral

not at all praiseworthy ☐ ☐ ☐ ☐ ☐ ☐ ☐ very praiseworthy

not at all blameworthy ☐ ☐ ☐ ☐ ☐ ☐ ☐ very blameworthy

not at all outrageous ☐ ☐ ☐ ☐ ☐ ☐ ☐ very outrageous

not at all acceptable ☐ ☐ ☐ ☐ ☐ ☐ ☐ very acceptable

2) People often have an opportunity to inflate how well they appear to have performed at their job. Some view such modification as a violation of truthfulness, others regard it as acceptable protection of personal interests. What do you think about the value of truthfulness in such a situation?

Truthfulness is something...

... that one should not sacrifice, no matter what the (material or other) benefits.

very strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ very strongly agree

... for which I think it is right to make a cost-benefit analysis.

very strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ very strongly agree

... that cannot be measured in monetary terms.

very strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ very strongly agree

... about which I can be flexible if the situation demands it.

very strongly disagree ☐ ☐ ☐ ☐ ☐ ☐ ☐ very strongly agree